NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
Dee Freeman, Secretary

December 8, 2010

Mr. Noel Lyons, President
McGill Environmental Systems, Inc.
634 Christian Chapel Church Road
New Hill, NC 27562

Subject: McGill Environmental System at Merry Oaks
A Large Type-4 Solid Waste Composting Facility
Permit Application and Operating Manual
Facility Permit No.: SWC-19-06

Dear Mr. Lyons:

Enclosed is your permit renewal to operate a Large, Type 4 Solid Waste Compost Facility at Merry Oaks, Chatham County, North Carolina. Please carefully read all permit conditions. The operation manual submitted with your application has been incorporated into your permit. Your permit number is 19-06 with an expiration date of December 8, 2015.

Mr. Robert Hearn, Waste Management Environmental Senior Specialist, will be responsible for facility inspections. Mr. Hearn can be contacted at 919-508-8533. If you have any questions please feel free to contact our staff engineer Mr. Zi-Qiang Chen, Ph.D. at 919-508-8523, or myself at 919-508-8508.

Sincerely,

Michael E. Scott

Michael E. Scott, Supervisor
Composting & Land Application Branch

cc: Gary MacConnell, P.E., MacConnell & Asso., 1903 N. Harrison Ave., Cary, NC 27513
Robert Hearn, NCDWM Field Operations Branch
Zi-Qiang Chen, Ph.D., Environmental Engineer II
DWM/SWS/CLA/PERMIT

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT
1646 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1646

McGill Environmental Systems, Inc.

is hereby issued a permit to operate a

LARGE, TYPE 4 SOLID WASTE COMPOST FACILITY

at 634 Christian Chapel Church Road, New Hill, NC 27562

Permit Number SWC-19-06

in accordance with Article 9, Chapter 130A, of the General Statutes of North Carolina and all rules promulgated there under and subject to the conditions set forth in this permit.

12/8/10
Date

Michael E. Scott, Branch Head
Solid Waste Section

Permit Conditions:

1. Operation and maintenance of this facility shall be in accordance with the Solid Waste Compost Rules (15A NCAC 13B, Section .1400), the Permit Application and the Operation and Maintenance Manual submitted with the permit application. Failure to comply may result in compliance actions or permit revocation.

2. This facility shall be operated in such a manner that erosion and runoff from the site shall be controlled. Any leachate generated at the facility and any runoff from the facility shall be managed in such a manner that ground or surface water quality will not be adversely affected. The facility shall be maintained to prevent the accumulation of stormwater or leachate on travel areas or active composting sites.

3. An appropriate Division of Water Quality permit for managing any stormwater or wastewater at the facility shall be maintained as required. Additional surface water and groundwater monitoring shall be implemented based on the recommendations from the Compost Operation Stakeholder Advisory Committee (formed under the direction of HB 1100) or as required by the Division of Waste Management.

4. Only materials specifically listed in the permit application may be managed at this facility. Before additional materials including feedstocks listed within the permit application as potential waste streams may be added, there must be adequate testing and prior approval by the Division of Waste Management in writing.

5. All compost produced at the facility shall meet the requirements of Rule .1407 of the Solid Waste Compost Rules and the permit application.

6. Testing and reporting shall be conducted in accordance with the requirements of Rule .1408 and the permit application. An annual report of facility activities for the fiscal year July 1 to June 30 shall be submitted to the Division by August 1 of each year on forms provided by the Division. This report shall include the amount of materials received and composted in tons.

7. The compost operation and the compost pad shall be operated and maintained with sufficient dust control measures to minimize airborne emissions and to prevent dust from becoming a nuisance or safety hazard.

8. Compost data shall be maintained as required to document temperatures, moisture levels and aeration intervals. Bulk density and C:N calculations shall be reviewed no less than every 14 days.

9. McGill shall ensure that windrow moisture levels in the compost windrows are maintained in the 40-60% range for newly created windrows and compost windrows within PFRP.

10. Dimensions for active composting shall be limited to a maximum of 8-feet high x 30-feet wide unless otherwise approved by the Division.

11. In the event of a mechanical failure, McGill shall immediately use its best effort to utilize substitute equipment for completion of the composting operation.

12. Windrow turning shall not occur without consulting weather forecasts for favorable conditions including temperature, wind direction, temperature inversions, and precipitation.

13. Upon receipt of an odor complaint, the facility operator shall investigate and take actions as necessary to minimize the cause of the complaint. A copy of all written complaints regarding this facility shall be maintained for the duration of the permit including the operator's actions taken to resolve the complaints.

14. The odor management plan shall be followed to minimize odors at the facility boundary.

15. Odorous feedstocks shall not be accepted at the facility unless it is demonstrated that the feedstocks can be effectively composted. Feedstocks shall not be received that are in an anaerobic state.

16. The facility shall be operated in a manner that reduces the potential for vector attraction.

17. Stockpiling of finished product shall be limited to a height of 30'.

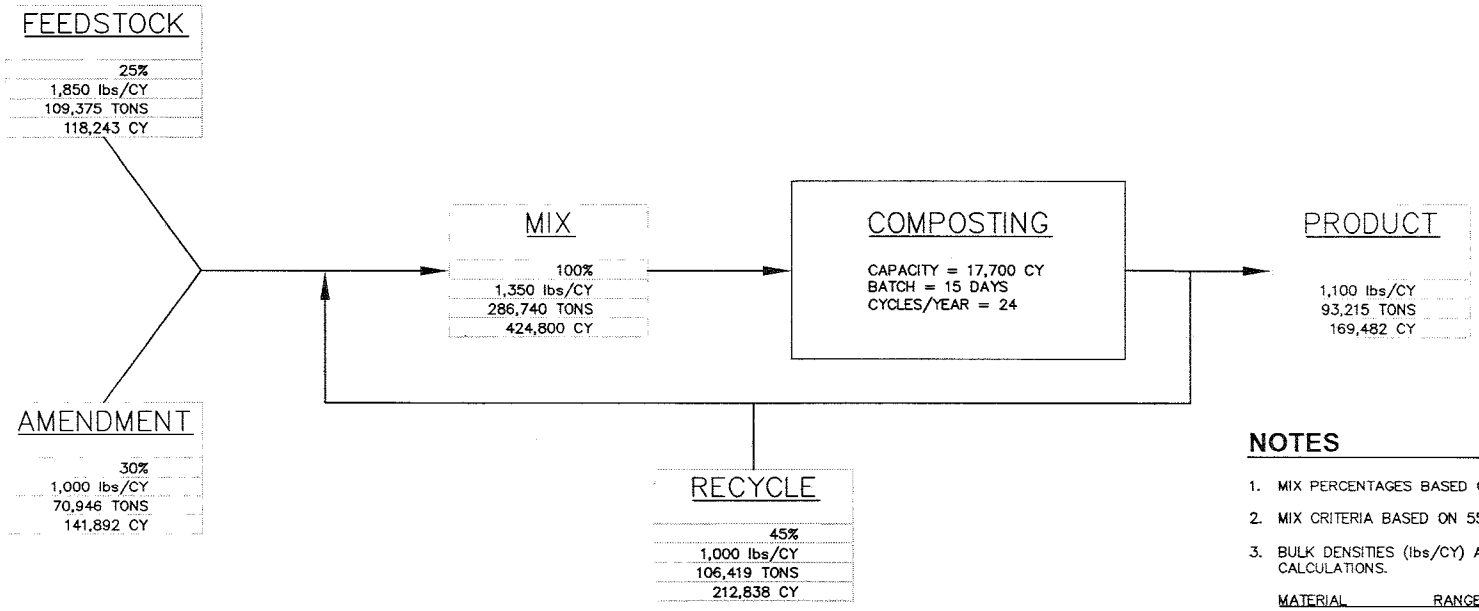
18. Areas of structure distress, cracks, localized failures, or expansion joint deterioration shall be documented and repaired immediately.

19. The facility operational capacity for this permit shall be limited to 151,200 tons of materials composted per year. This tonnage limit includes the summation of all feedstocks, amendments and recycled material utilized in the compost process.

20. This permit shall expire on December 8, 2015. A properly completed application for permit renewal shall be submitted at least 90 days prior to the permit expiration date. Changes in ownership, increase in facility capacity or receiving feedstocks not identified in the permit application shall require a permit modification.

McGILL COMPOSTING FACILITY
MERRY OAKS

MIX: 25% FEEDSTOCK - 30% AMENDMENT - 45% RECYCLE



PLANT CAPACITY

(FEEDSTOCK & AMENDMENT)
180,321 TONS
260,135 CY

NOTES

1. MIX PERCENTAGES BASED ON VOLUME.
2. MIX CRITERIA BASED ON 55% MOISTURE.
3. BULK DENSITIES (lbs/CY) AVERAGES USED IN CALCULATIONS.

MATERIAL	RANGE	AVERAGE
FEEDSTOCK	1,750 – 1,950	1,850
AMENDMENT	700 – 1,300	1,000
RECYCLE	750 – 1,200	1,000
MIX	1,300 – 1,430	1,350
PRODUCT	750 – 1,200	1,100

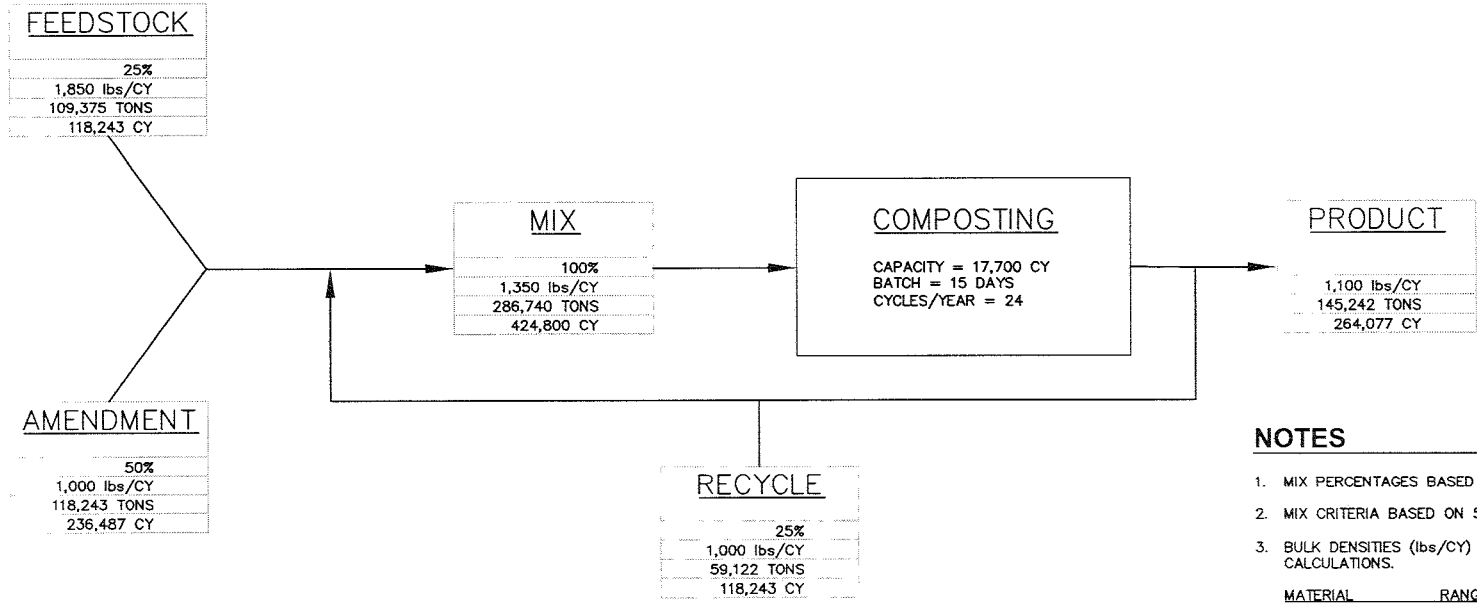
4. RECYCLE: UNSCREENED COMPOST, SCREENED OVERS, AND/OR SCREENED COMPOST.
5. FACILITY CAPACITY: (20 BAYS x 100ft x 30ft x 8ft)/ 27C.F./C.Y. = 17,700 CY.
6. MIX VOLUME REDUCED WHEN FEEDSTOCK, AMENDMENT AND RECYCLE ADDED.
7. COMPOST PROCESS REDUCES VOLUME BY 10 PERCENT.
8. ROUNDING ERRORS RESULTS IN ANY DISCREPANCY.

MacCONNELL & Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NORTH CAROLINA 27513
P. O. BOX 129
MORRISVILLE, NORTH CAROLINA 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

PROJECT NUMBER
A26704.10

McGILL COMPOSTING FACILITY
MERRY OAKS

MIX: 25% FEEDSTOCK - 50% AMENDMENT - 25% RECYCLE



PLANT CAPACITY

(FEEDSTOCK & AMENDMENT)
227,618 TONS
354,730 CY

NOTES

1. MIX PERCENTAGES BASED ON VOLUME.
2. MIX CRITERIA BASED ON 55% MOISTURE.
3. BULK DENSITIES (lbs/CY) AVERAGES USED IN CALCULATIONS.

MATERIAL	RANGE	AVERAGE
FEEDSTOCK	1,750 – 1,950	1,850
AMENDMENT	700 – 1,300	1,000
RECYCLE	750 – 1,200	1,000
MIX	1,300 – 1,430	1,350
PRODUCT	750 – 1,200	1,100

4. RECYCLE: UNSCREENED COMPOST, SCREENED OVERS, AND/OR SCREENED COMPOST.
5. FACILITY CAPACITY: (20 BAYS x 100ft x 30ft x 8ft)/ 27C.F./C.Y. = 17,700 CY.
6. MIX VOLUME REDUCED WHEN FEEDSTOCK, AMENDMENT AND RECYCLE ADDED.
7. COMPOST PROCESS REDUCES VOLUME BY 10 PERCENT.
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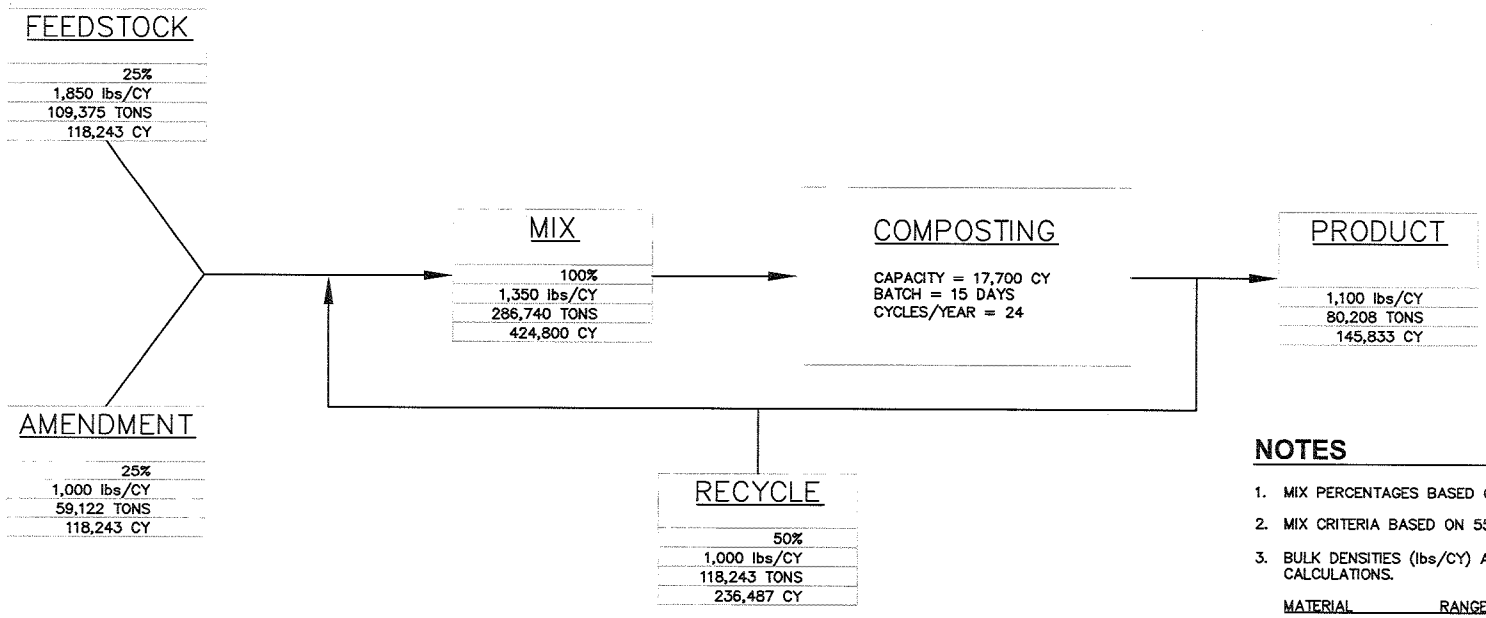
McGILL COMPOSTING FACILITY
MERRY OAKS

MIX: 25% FEEDSTOCK - 25% AMENDMENT - 50% RECYCLE



NOTES

1. MIX PERCENTAGES BASED ON VOLUME.
2. MIX CRITERIA BASED ON 55% MOISTURE.
3. BULK DENSITIES (lbs/CY) AVERAGES USED IN CALCULATIONS.

MATERIAL	RANGE	AVERAGE
FEEDSTOCK	1,750 – 1,950	1,850
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RECYCLE	750 – 1,200	1,000
MIX	1,300 – 1,430	1,350
PRODUCT	750 – 1,200	1,100

4. RECYCLE: UNSCREENED COMPOST, SCREENED OVERS, AND/OR SCREENED COMPOST.
5. FACILITY CAPACITY: (20 BAYS x 100ft x 30ft x 8ft)/ 27C.F./C.Y. = 17,700 CY.
6. MIX VOLUME REDUCED WHEN FEEDSTOCK, AMENDMENT AND RECYCLE ADDED.
7. COMPOST PROCESS REDUCES VOLUME BY 10 PERCENT.
8. ROUNDING ERRORS RESULTS IN ANY DISCREPANCY.

PLANT CAPACITY

(FEEDSTOCK & AMENDMENT)
168,497 TONS
236,487 CY

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PROJECT NUMBER
A26704.10

McGill Environmental Systems

Regional Composting Facility

At Merry Oaks

Permit Renewal Application

August 2010

APPROVED
MES 12/8/10

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL
8/31/10

RECEIVED SOLID WASTE SECTION

Owner:

McGill
634 Christian Chapel Church Road
New Hill, NC 27562

Telephone: 919/362-1161
Facsimile: 919/362-1141

Engineer:

MacConnell & Associates, P.C.
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Morrisville, NC 27560

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Appendices A through F

RECEIVED NOV 15 SOLID WASTE

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1. General

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SOLID WASTE SECTION

MacConnell & Associates, P.C.

1. General

The McGill Chatham facility which is also called the Merry Oaks facility is located at 634 Christian Chapel Church Road in New Hill, North Carolina, 27562. The contact person at the facility is Steve Cockman and he may be reached at 919/362-1161. This facility is presented in three drawings which may be found in Appendix A. These drawings are: an overall site plan of the property which is drawn at 100 scale, a blow up of the composting facility which is drawn at 50 scale, and an aerial view of the site which is presented at 200 scale and shows neighboring properties and features. These three drawings show the various features required by 15A NCAC 13B. No other permit than the compost permit SWC 19-06 from the Division of Solid Waste is required for the facility. A letter from the Chatham County Planning & Development Department is in Appendix B.

When the McGill Chatham facility opened in 2002 it represented the best available and affordable design available to McGill. Through the eight years of operation at Chatham and the design and construction of two new McGill plants elsewhere in the world a number of design and operational improvements have been developed. McGill is committed to bringing all of these advancements to the Chatham Facility where at all feasible and beneficial.

The newest design development involves the further confining of the primary processing bays for the 1st 5 to 7 days. This would involve a cubicle type structure encasing each of these bays. The benefits of this are as follows:

1. The air with the highest odor potential is confined in a small area. From here it can be better managed. The reduced quantity allows for extended residence time in the Biofilter.

2. Confining this air greatly reduces corrosion on the main building. This is a challenge in all indoor composting facilities, due to corrosive gases and moisture.

3. It dramatically improves the main building environment, especially in wintertime when fog can be an issue.

4. It gives us the ability to have a dryer product going to curing.

5. Overall this design will result in about a 30% energy cost reduction.

In addition to the above benefits this further confinement would not change the present operational, regulatory, and/or quality standards. For example, achieving Process to Further Reduce Pathogens (PFRP) and Vector Attractant Reduction Potential (VAR) requirements indoors will be met. Air from all areas of the building would go to the same biofilter. Feedstocks and amendments would not change nor would typical mixing ratios.

A number of housekeeping and major maintenance projects have been recently completed, are under way, or planned for this year. These projects include:

1. Replacing all significantly corroded sheeting (Completed).

2. Replacement of some metal doors with more air tight Fabric doors.

3. Overhaul of Biofilter fans with at least one replacement.

4. Commencement of the replacement of the Biofilter media. So as to not have any significant impact on operations this will be performed one bay at a time between the summer of 2009 and the fall of 2010.

5. Replacement of all broken concrete in the isle of the processing building (Completed).

6. Raise the concrete walls for several bays (Completed).

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2. Permit Application

MacConnell & Associates, P.C.

2. Permit Application

2.1 General Information

No change from Permit Application submitted in February 2004.

The overriding facility design criteria centers on achieving Process to Further Reduce Pathogens (PFRP) and Vector Attraction Reduction (VAR) within the composting building. Design accommodates inside and outside curing. Final product storage, screening and loading is done outside

The facility is designed with independent process bays each measuring 100 feet by 30 feet. Material is typically stacked 8' high during processing. Each bay holds 880 cubic yards of material. Twenty five (25) % of this will be waste material with the remaining seventy five (75) % being made up of various amendments. Although the percentage of waste material in each full bay can vary depending on its characteristics, the amendments are the biggest influence. The 25% average is based on McGill experience with relatively nutrient rich materials such as biosolids and other organic sludges.

Allowing for a one day loss for removal and filling of each bay, the minimum cycle time is 15 days. The capacity calculations assume a weight to volume for waste materials of .9 cubic yards per ton.

Tons of waste per bay = 888 cubic yards (bay capacity at 8 feet high) / 4 (25%) x .9 tons/cubic yard = 200 tons.

Number of bays = 20. Batches per bay per year (365/15 (bay residence time) = 24

Total plant capacity = 200(tons per bay) x 20(number of bays) x 24(number of batches per bay per year) = 96,000 tons.

2.2 Site Characteristics

The curing area has been expanded. This is reflected in the attached site plan. A designated grinding area is established at the south west end of the site. This is also indicated on the attached site plan.

2.3 Physical Plant

2.3.1 Structure

All recycle pipes have been removed. Over time these pipes had caused significant maintenance problems with the supply fans with little or any benefit.

Over time significant damage had occurred to the concrete floor in the main traffic isle through the middle of the building. This is the area receiving most loader traffic. Virtually the entire isle in the primary processing area was replaced in the Summer of 2009. The replacement slab thickness was increased by 33% from the original design and the strength of the concrete was increased.

A stormwater plan is included in Appendix A. Runoff, erosion, and sedimentation have not been an issue. There is no leachate retention pond. All leachate is contained within the processing building. Stormwater basins are shown on the drawing.

2.3.2 Primary Aeration Area

There are no changes to the Aeration System.

2.3.3 Active Curing Area

The curing area has been expanded. This is detailed in the drawings contained in Appendix A. The curing pad was constructed using lime stabilized fly ash. This material when set in place produces a very impermeable surface similar to a low grade concrete. The permeability testing of the pad are contained in Appendix C. The pad was constructed on a deep layer of indigenous clay soil with permeability in excess of $1*10^{-7}$. The field report on the clay soil is also contained in Appendix C.

The ash pad has a minimum depth of 2 feet. The pad was constructed in a series of layers, watered and compacted repeatedly during placement. Though this material offers an excellent wear surface for loaders occasional damage will occur. When this occurs damaged areas are repaired using similar ash material.

2.3.4 Outdoor Areas and Features

Product storage bunkers have been installed in the product storage area. This allows for better housekeeping and more efficient use of space.

The grinding area was established to prepare amendments and bulking agents in the plant. This activity has insured a reliable source of amendments is always available.

Please refer to the three drawings in Appendix A. The facility's physical location is shown on the updated aerial photo, also shown are the adjacent (within the ¼-mile radiance) surroundings,

and a legend to denote these features and the *100-year* flood plan and other major hydro-geological features on the map. The facility is not located within a *100-year* flood plain.

The product storage bunkers are shown on the 50 scale drawing in Appendix A.

2.3.5 Biofilter

The biofilter remains the same as at time of last permit renewal. The media was last changed in 2007 and is scheduled to be changed again in 2010.

The sprinkler system was removed during the last media change. It had never been used and numerous inspections verified that additional moisture was never needed. We believe the high moisture air leaving the processing building through the biofilter insures adequate moisture in the media.

See drawing which is included in Appendix D. The biofilter measures 100 feet by 380 feet. The air distribution system consists of the following. There are Ten (10) biofilter extraction fans each with a fifteen (15) Horse power motor. These fans lie along the building side of the biofilter. A 28-inch diameter header duct which measures 37 feet long is attached to each fan. Five (5) pipes (distribution pipes) measuring 12 inches in internal diameter are attached perpendicular to each header duct and run the width of the biofilter. These pipes have 1-inch openings at 9 and 3 o'clock every 6 inches. The Biofilter media is in two layers. The lower level consists of larger diameter material typically ranging from 2 to 4 inches. This larger material better facilitates the lateral distribution of air at the base of the biofilter.

The upper layer of finer material is 2.5 feet deep. The material in this layer consists predominantly of 1 to 2 inch material with a minor concentration of fine compost. The outer edge of the biofilter is capped with finer material to prevent any short circuiting of air.

2.3.6 Intake Air Plenum

The intake air plenum is constructed of concrete and is still functioning perfectly. As noted above in 1.3.1 the recycle pipes have been removed.

2.3.7 Blending

Bucket blending has now taken over as the sole blending mechanism. All wheel loaders are suitable for this purpose and several employees are trained in this function.

There are no significant seasonal variations in feed stock with some exceptions. Yard waste by its nature varies with the seasons. The most significant variation is a higher portion of grass in the summer versus leaves in the fall. We manage this by adjusting amendment usage. It is by no means a significant issue.

2.4 Equipment

2.4.1 Intake Air Plenum

There have been no changes to the specifications of the aeration and extraction system except for removal of the recycle pipes.

2.4.2 Screening

A Doppstadt Model 720 was installed with a 3/8-inch screen.

2.4.3 Grinding

Grinding of material is currently contracted.

2.4.4 Compost Curing

A Wildcat Model 614 Windrow Turner was installed for curing.

2.4.5 Biofilter Odor Control System

In addition to odor prevention the biofilter remains the main method of ODOR control.

2.4.6 BAT Odor Control System

The BAT odor control system is located in the shelter located next to the ramp area and is equipped with a timer.

Much has been written about validity and performance of odor misting systems. They can be categorized as either odor masking or neutralizing systems. There is skepticism surrounding masking systems and we share that skepticism. Though by no means an exact science, there is ample field assessment on the benefits of neutralizing compounds. They are in widespread use at landfills, transfer stations, sensitive collection sites such as grocery stores, apartment complexes etc. They are also used during onetime odor causing events such as lagoon cleanouts. Much of the evidence is in the form of anecdotal stories related to random field observations.

The McGill Merry Oaks facility has an odor control system in place. It was supplied and installed by NCM Inc. out of New Jersey. The components of the system are as follows: metering pump, timer, ducting and a series of nozzles over all doors. The product used in the system is SL-4000 Odor Neutralizer Winter Mix. (See attached MSDS which is included in Appendix E). This system is used on an as needed basis.

2.4.7 Monitoring Equipment

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The facility has at all times a number of manual temperature probes. A number of bays are checked by manual probe against the automated system at least weekly. Additionally, manual readings are taken whenever a reading from the automated system appears abnormal.

2.4.8 Equipment Maintenance

There is no set plant annual overhaul. The approach to maintenance is determined by the needs and manufacturer's recommendations for each piece of equipment.

1. Wheel Loaders: All major servicing is performed under a service contract with the supplier. Daily greasing, fluids inspection and cleaning are performed by the operator. Greasing and fluids check is always as per manufacturers specifications.

2. Fans: Fans are inspected daily. This involves a visual inspection by the manager or maintenance technician. Fans are greased monthly.

3. Screening Plant: Daily servicing is performed by maintenance technician and operator. This involves greasing, checking fluids, belts and radiator intake. In addition, 250-hour service is performed by McGill Staff. Any larger maintenance or repair is performed by qualified outside vendors.

4. Windrow Turner: Daily and 250-hour servicing is performed by McGill staff. All larger servicing is performed by a contractor.

2.4.9 Flow Diagram and Fact Sheet

See flow diagram which is included in Appendix F. Process is summarized in Fact Sheet below:

Fact Sheet:

23 Supply Fans: Each is a 7.5 hp 3 phase fan with maximum capacity of 8,000 CFM at 5 inches of water pressure (column).

23 Bays: Each measuring 100 feet x 30 feet. These will typically be filled to a height of 8 feet.

Loaders: Blending Loader: Liehberr 566 with a 9 cubic yard bucket.

Bay Screening Loader: Liehberr 580 with an 11 cubic yard bucket.

Finished Product Loader: Liehberr 538 with a 7 cubic yard bucket.

Windrow Loader: Liehberr 528 with a 3 cubic yard bucket.

Bobcat Skid Steer Loader: with a .5 cubic yard bucket, and power sweeper.

Screening Plants:

Plant 1 (inside screen): This is custom built 6 feet by 24 trommel with a maximum capacity of 250 cubic yards per hour. As with all screening plants moisture content has the greatest impact on throughput.

Plant 2 (outside screen): This is a Dopstadt 721 trommel with a maximum of 200 cubic yards per hour.

Blending Area: Waste offloading pit = 400 tons.

Amendment Inside Storage: 3,200 cubic yard.

Amendment Storage Outside: 2,980 cubic yard.

Processing Building Capacity: 17,760 cubic yards

Curing Capacity Indoors: 3,000 cubic yards

Curing Capacity Outdoors: 12,312 cubic yards.

Unscreened Product Storage: 9,000 cubic yards.

Screened Product Storage: 1,900 cubic yards.

Waste Flow: A number of options exist for managing materials through the bays, two options are of interest to us. We term those the USA Option and the Glenville Option (this is the option in use at all Irish facilities).

USA Option: This is the option presently employed at the Merry Oaks facility.

Step 1: all materials are blended in the blending building.

Step 2: Material is then moved to processing bays. All material remains in the bays until PFRP and VAR are achieved. After 14 plus days, the material in any bay that has failed to meet PFRP and/or VAR is returned to the blending area.

Step 3: Material is screened and a portion may be brought directly to the blending area for reuse. Screened material is moved to windrows, inside curing bays, or sold as McGill AG product.

Step 4: Material is windrowed for curing or placed in curing bays. For curing purposes, material is typically windrow cured for 30+ days or in curing bays for 10+ days.

Step 5: Windrows are removed and stored in the unscreened compost storage area. Material will typically remain here for 90+ days.

Step 6: Compost is screened and placed in the compost storage bunker for sale. At this point compost may also be loaded onto trucks for delivery directly from screening plant.

Mass Balance for the USA Option:

USA Option: 20 bays at 15 days residence time. Each bay gets used 24 times per year. 200 tons x 24 time x 20 bays = 96,000 tons per year. (Maximum capacity).

20 bays x 24(bay use per year) x 880(cubic yards per bay) = 422,400 cubic yards processed through 1st step per year.

Assume a 10% reduction during 1st step = 42,240 cubic yards.

Assume 30% recycle unscreened = 114,048 cubic yards.

Amount screened is 266,112 cubic yards resulting in 133,056 cubic yards of compost for curing and 133,056 cubic yards Overs for reuse.

Curing Windrows: windrow capacity 12,312 cubic yards.

Windrow uses per year = 133,056 cubic yards /12,312 cubic yards = 10.8 = 33 days.

Curing Bays: Capacity is 3,000 cubic yards. Assuming there is 14 days residence time. Indoor curing capacity = 78,000 cubic yards.

Plant capacity: Waste materials plus amendments measured in tons

Number of Bays 20, Residence time 15 days. Bay cycles per year 24.

Bay capacity 572 tons. (880 cubic yards @ 1300 lbs/cubic yard)

Waste	200
Recycle (Overs + compost)	257
Amendments	115
Total tons per bay	572

Plant Capacity = Tons of waste per bay (200) + tons of amendments per bay (115) * number of bays (20) * number of bay cycles per year (24)

(200+115)*20*24 = 151,200 Tons per year.

The Glenville Option: This option, which has been in use for a number of years in Ireland, calls for more active management of the material within the building through earlier screening and significant curing indoors. This results in diminishing outside curing and operating a plant on a significantly smaller footprint. The key difference is that with this option material is screened

indoors after one week when PFRP has been achieved. The screened material is then returned for further processing/curing for a further 14 plus days. At that point material can be moved a 3rd time for further curing.

In a well controlled aerated static pile environment the most intense biological activity takes place in the 1st few days. The early screening further homogenizes the mix, redistributes moisture and enzymes stimulating further rapid biodegradation. There is also a very significant space efficiency gained through the screening process.

Mass Balance for the Glenville Option:

Step 1: Materials remain in bay for 1 week.

Nine bays dedicated to 1st step. 9 bays x 200 (tons per bay) x 52 (one week residence time) = 93,600 tons per year.

880 cubic yards per bay x 9 bays x 52 weeks = 411,840 cubic yards per year processed through 1st step.

Assume a 10% reduction, assume 30% recycle before screening =111,196 cubic yards.

259,460 cubic yards screened resulting in 129,730 cubic yards screened and 129,730 Overs returned to blending area for reuse.

Step 2: Curing bays at 1,000 cubic yards per bay for 2 weeks requires (129,730 cubic yards /26 /1,000) 5 bays. (Assume redundancy of 20%) total requirement is 6 bays.

Step 3: Move curing bays to another bay for further curing. This requires 2 to 3 bays per week of residence time.

Total Bay usage 9+6+3 = 18. This gives a 28 day residence time indoors for all material

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Appendix A

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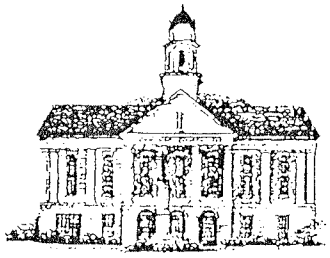
Appendix B

RECEIVED
SOLID WASTE SECTION

MacConnell & Associates, P.C.

COUNTY OF CHATHAM

ING DEPARTMENT
ST OFFICE BOX 54
TTSBORO, N. C. 27312-0054



ORGANIZED 1770 707 SQUARE MILES

PHONE: 919-542-8204
FAX: 919-542-0527
email: ccplan@emji.net

October 17, 2000

Steve Cockman
McGill Environmental Systems of NC, Inc.
PO Box 61
Harrells, NC 28444

Dear Mr. Cockman:

During their regular meeting October 16, 2000, the Chatham County Board of Commissioners considered your request as described below:

> Request by McGill Environmental Systems of NC, Inc. for a Heavy Industrial Conditional Use District with a Conditional Use Permit for a recycling plant with limited retail sales of product, on 48.5 acres, off S. R. 1912 (Christian Chapel Road), in Cape Fear Township.

After considering your written request, comments received at the public hearing, and recommendations of the County Planning Department and Planning Board, the Board of Commissioners approved your request as submitted with the following eight (8) conditions.

1. Lights shall be shielded on the top and sides to prevent spillage onto adjacent properties and into the night sky.

2. Noise levels at the property line shall not exceed acceptable levels as required in the Chatham County Noise Ordinance.

3. A storm water retention system shall be designed and installed to retain the first ½ inch of runoff from impervious surfaces. Said system shall be reviewed by the Chatham County Planning Director prior to installation and be completed prior to issuance of a certificate of occupancy.

4. A minimum 100-foot wide undisturbed vegetative buffer shall be maintained along the state right-of-way except for driveway entrance(s).

5. There shall be no land filling of waste on the property but outside storage may include non-animal products, and finished mulch products.

6. A commercial driveway permit shall be obtained from NCDOT and submitted prior to the issuance of the building permit.

7. An erosion control permit shall be obtained from the NCDEHNR and submitted prior to the issuance of the building permit.

8. Building permits shall be obtained within 12 months of approval and remain valid or the Conditional Use Permit shall become null and void.

Minutes of the meeting are available from Ms. Sandra Lee, Clerk to the Board of County Commissioners, at 542-8200. If you have any questions about the Board's action or would like to discuss uses of your land, please call me at 542-8207 or Keith Megginson at 542-8205.

Sincerely yours,

Lynn W. Richardson

Lynn W. Richardson
Land Use Administrator II

LWR/ke

pc: Ruby Williams Lolwing
Hearn Estate, c/o J.L. Hearn
Cindy Perry, Attorney

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Appendix C

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TERRATECH
ENGINEERS • INC

Geotechnical Engineering
Environmental Consulting
Construction Materials Testing

April 11, 2003

McGill Environmental Systems, Inc.
P.O. Box 374
Pittsboro, NC 27312

Attention: Mr. Steve Cockman

Report of Permeability Evaluations
McGill Environmental
Pittsboro, North Carolina
Our Project Number 121-01-24090

Gentlemen,

As requested, Terra Tech has performed an analysis of the permeability of the soil-cement mixture used as a base for the bio-filter, wood storage pad and compost storage pad at the referenced property. During the initial stages of design for the project, a number of samples were tested using the natural soils at the site mixed with varying quantities of lime, flyash and cement. A permeability of 1E-07 cm/sec was achieved using a mixture of the natural soil and 12% cement compacted to 95% of the soils standard Proctor maximum dry density. A copy of the standard Proctor test for the material is enclosed. Density testing performed on the completed pads indicated that the soil-cement mixture used at the site was compacted to at least 95% of the standard Proctor maximum dry density, as shown on the enclosed Field Density Report. Since the field density of the compacted mixture exceeds the density at which the required permeability was achieved, the permeability of the field compacted mixture would meet the minimum permeability requirement of 1E-07 cm/sec. Due to the hardness of the mixture, thickness testing could only be performed on the perimeter of the pads. In the locations tested, the thickness of the mixture was a minimum of 20 inches.

If you have any questions concerning these test results, please do not hesitate to call us.

Sincerely,

TerraTech Engineers, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 024900 ENGINEER JAMES E. THOMAS, III

J. Elvey Thomas, III, P.E.
Sr. Geotechnical Engineer

ETW/jb

TerraTech Engineers, Inc.
3900 Tarheel Drive, Suite 106
Raleigh, North Carolina 27609
(919) 876-9799

TERRATECH
ENGINEERS · INC

DAILY REPORT

ject: McGILL ENVIRO. Job Number

Day THUR Date 3-27-3

eather: Clear Partly Cloudy Overcast Rain Representative: JAMES H. JOHNSON

mperature: <32 32-50 50-70 70-90 >90 Arrival Time: Mileage:

Total Hours: Standby:

marks: TECH ONSITE TO PERFORM TESTING AND EVALUATION OF OUTDOOR (FLYASH TYPE) SLAB (PAD) FOR MULCH. PAD APPEARS FULLY CURED AND IS INPENETRATABLE BY HAND AUGER OR NUCLEAR GAUGE PIN. TECH FINT CLEANED MULCH FROM SURFACE ON PAD AND PERFORMED 4 NUCLEAR DENSITY TT. TECH HAD FULLSIZE FRONT END LOADER EXCAVATE NORTH EDGE OF PAD 65'E OF NW SLAB CORNER. TECH VERIFIES SLAB THICKNESS AT 20" IN THIS LOCATION

"FEILD REPORT SUBJECT TO REVISION BY ENGINEERS"

raTech Representative: Received by:

TERRATECH
ENGINEERS • INC

DAILY REPORT

ject: McGILL ENVIRONMENTAL Job Number 121-01-20490

Day TUES Date 12/3/01

ather: (Clear) Partly Cloudy Overcast Rain

nperature: <32 32-50 (50-70) 70-90 >90

Representative: WM CHRISTENSON

Arrival Time: 1030 Mileage: —

Total Hours: 4.0 Standby: —

narks: AS REQUESTED, A REPRESENTATIVE WAS PRESENT AT THE
BOVE REFERENCED SITE ON TUESDAY DECEMBER 3, 2001.
THE PURPOSE OF OUR SITE VISIT WAS TO EVALUATE
THE COMPOST BUILDING SUBGRADE SOILS. RECENT A PERMEABILITY TESTING
T TIME OF THE COMPOST BUILDING SUBGRADE SOILS
EVEALED GREATER THAN 1×10^{-7} PERMEABILITY RATING.
TWO TYPES OF SOILS WERE OBSERVED IN THE
OMPOST BUILDING AREA. THE WEST HALF OF THE
OMPOST BUILDING SUBGRADE SOILS CONSIST OF
RANGE TAN CLAYEY SILT (ML) WITH TRACE SAND.
HE EAST HALF OF THE COMPOST BUILDING SUBGRADE
OILS CONSIST OF BROWN f-M SANDY SILT (ML)
ITH GRAVEL.
DENSITY TESTING WAS CONDUCTED IN EACH
OIL TYPE. PROCTOR SAMPLES WERE ALSO OBTAINED
ROM EACH SOIL TYPE.
WE RECOMMEND CONDUCTING A PROCTOR ANALYSIS
N EACH SOIL TYPE. WE THEN RECOMMEND
VALUATING THE DENSITY TEST RESULTS (ATTACHED)
O DETERMINING THE PRESENT COMPACTION OF
ACH SOIL TYPE IN THE BUILDING AREA.

raTech Representative: [signature] Received by:

McGILL

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Appendix D

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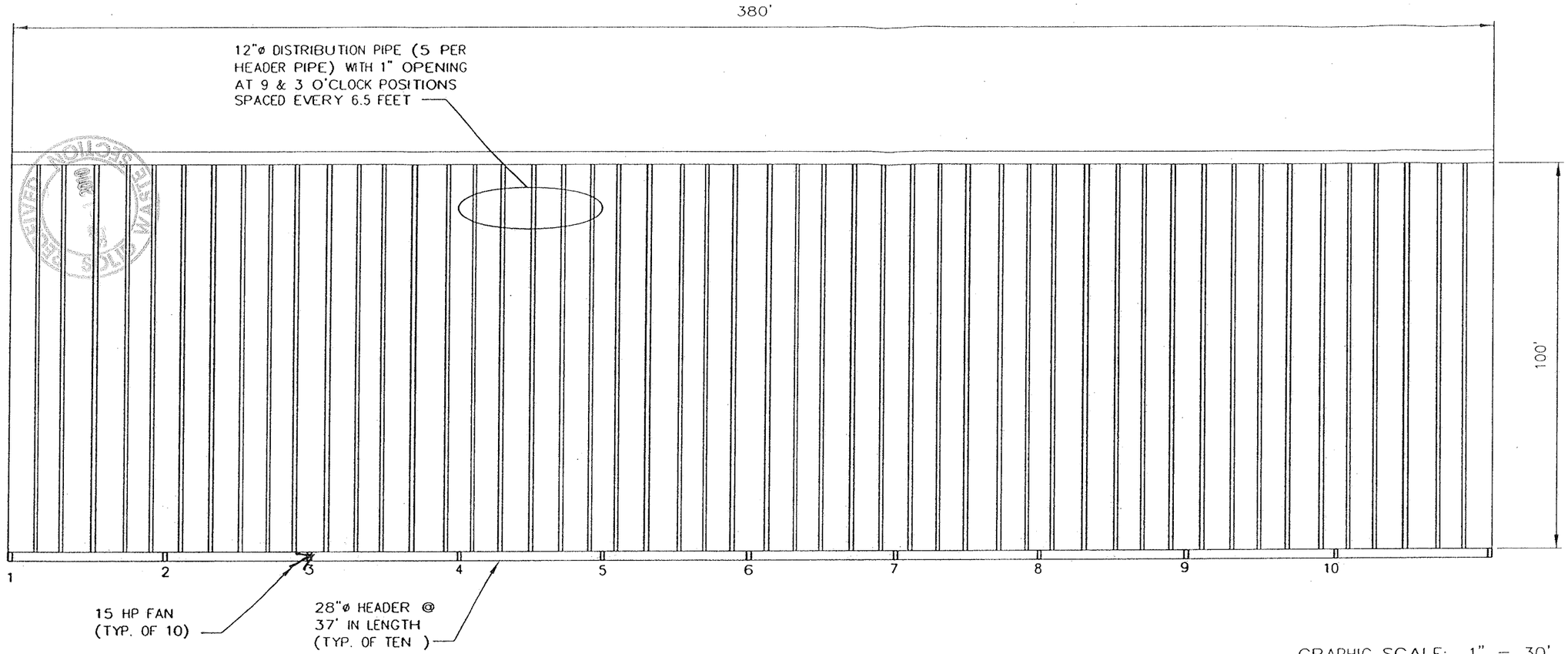
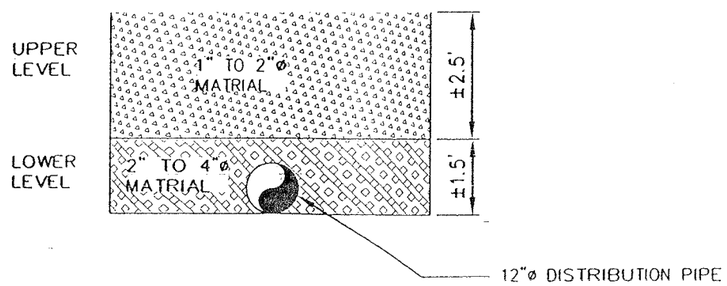


2 / C-1 **BIO-FILTER LAYOUT**
1'=30'

GRAPHIC SCALE: 1" = 30'
0 15 30 60 90



1 / C-1 **BIO-FILTER CROSS SECTION**
NTS

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL
7/12/10

MacCONNELL & Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NORTH CAROLINA 27513
P. O. BOX 129
MORRISVILLE, NORTH CAROLINA 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

BY: MAE
JOB #: A26704.00
DATE: 07/12/10

PROJECT: MCGILL ENVIRONMENTAL SYSTEMS
BIOFILTER LAYOUT
CHATHAM COUNTY, NC

REFERENCE C-1

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Appendix E

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SOLID WASTE SECTION

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MATERIAL SAFETY DATA SHEET

NCM Odor Control
425 Whitehead Ave
South River, NJ 08882
Phone732-238-6700

N.A.=Not Applicable
Not Est.=Not Established

Prepared by: Regulatory Affairs Department

Date: 04/20/2008

SECTION 1- GENERAL PRODUCT DATA

Product Name: SL-4000 ODOR NEUTRALIZER WINTER MIX
Product Code: ORCXCTW
HMIS Legend: 4-Extreme 3-High 2-Moderate 1-Slight 0-Insignificant
HMIS Hazard Code: Health:1 Flammability:0 Reactivity:0
Chemical Family: Odor Neutralizer
D.O.T. Shipping Name: Compound, Cleaning Liquid

CHEM-TEL, INC.
24 Hour Emergency Contact 1-800-255-3924
Chemical Strength: Mildly acidic
Formula: Proprietary

Hazard Class: N/A

SECTION 2 - HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	OSHA PEL	ACGIH TLV	%
PROPYLENE GLYCOL	57-55-6			>30

Unidentified ingredients are not considered hazardous under the Federal Hazard Communications Standard (29 CFR 1910. 1200)

SECTION 3 - PHYSICAL DATA

Boiling Point (^{o}F): 214
Vapor Pressure (mm Hg): = N/A
Appearance: orange, medium viscosity liquid
Specific Gravity: 1.012
Percent Volatile By Volume: N/A
Evaporation Rate: = N/A
Odor: citrus **pH:** 7.5 +/- 0.5

SECTION 4 - FIRE AND EXPLOSION DATA

Flash Point (F): N/A
Flammable Limits: N/A
Unusual Fire & Explosion Hazards: Not considered combustible
Special Fire Fighting Procedures: This product is not normally considered combustible and will not burn or sustain combustion

SECTION 5 - HEALTH HAZARD DATA

Route(s) of Entry: Inhalation: Yes Skin: Yes Ingestion: Yes **Threshold Limit Value:** N/A
Effects of Overexposure: Contact with eyes may cause irritation. May cause irritation and defatting of the skin.
Emergency & First Aid Procedures:
For Skin: Wash with cool running water. Seek medical attention if irritation develops.
For Eyes: Rinse with cool running water for 15 minutes. Seek medical attention if irritation develops.
Ingested: If swallowed, give several cups of water to dilute. Do not induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.

Carcinogen: Not considered carcinogenic by OSHA, NTP, or IARC

SECTION 6 - REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Spills and careless handling
Incompatibility: Strong oxidizing agents
Hazardous Decomposition Products: None anticipated
Hazardous Polymerization: Will not occur

SECTION 7 - SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:
Spills may be slippery. Stop flow of product. Collect large spills for proper disposal. Wash spill area with plenty of water.
Waste disposal method: Dispose of in accordance with all applicable federal, state and local regulations. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

SECTION 8 - SUGGESTED PROTECTIVE EQUIPMENT

Respiratory Protection: None usually required
Ventilation: Adequate general ventilation
Protective Gloves: Rubber or latex gloves
Eye Protection: Safety glasses recommended
Other Protective Equipment: None usually required

SECTION 9 - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage:
Store at room temperature. Keep from freezing. Keep container closed when not in use. Use with adequate ventilation. Avoid contact with eyes.
Other Precautions: Do not take internally. Avoid contamination of food. For industrail use only. Keep out of reach of children. Do not mix with anything but water. Avoid strong oxidizing agents.

SECTION 313 SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

This information must be included in all MSDS's that are copied and distributed for this material.

NOTICE

The information contained in this MSDS was obtained from current and reliable sources, however the data is provided without any warranty, expressed or implied, regarding its correctness or accuracy,including the implied warranties of merchantability or fitness for a particular use or method of application. Since the conditions or handling, storage and disposal of this product are beyond the control of this company, it is not responsible for loss, injury and expense arising out of the products improper use.

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Appendix F

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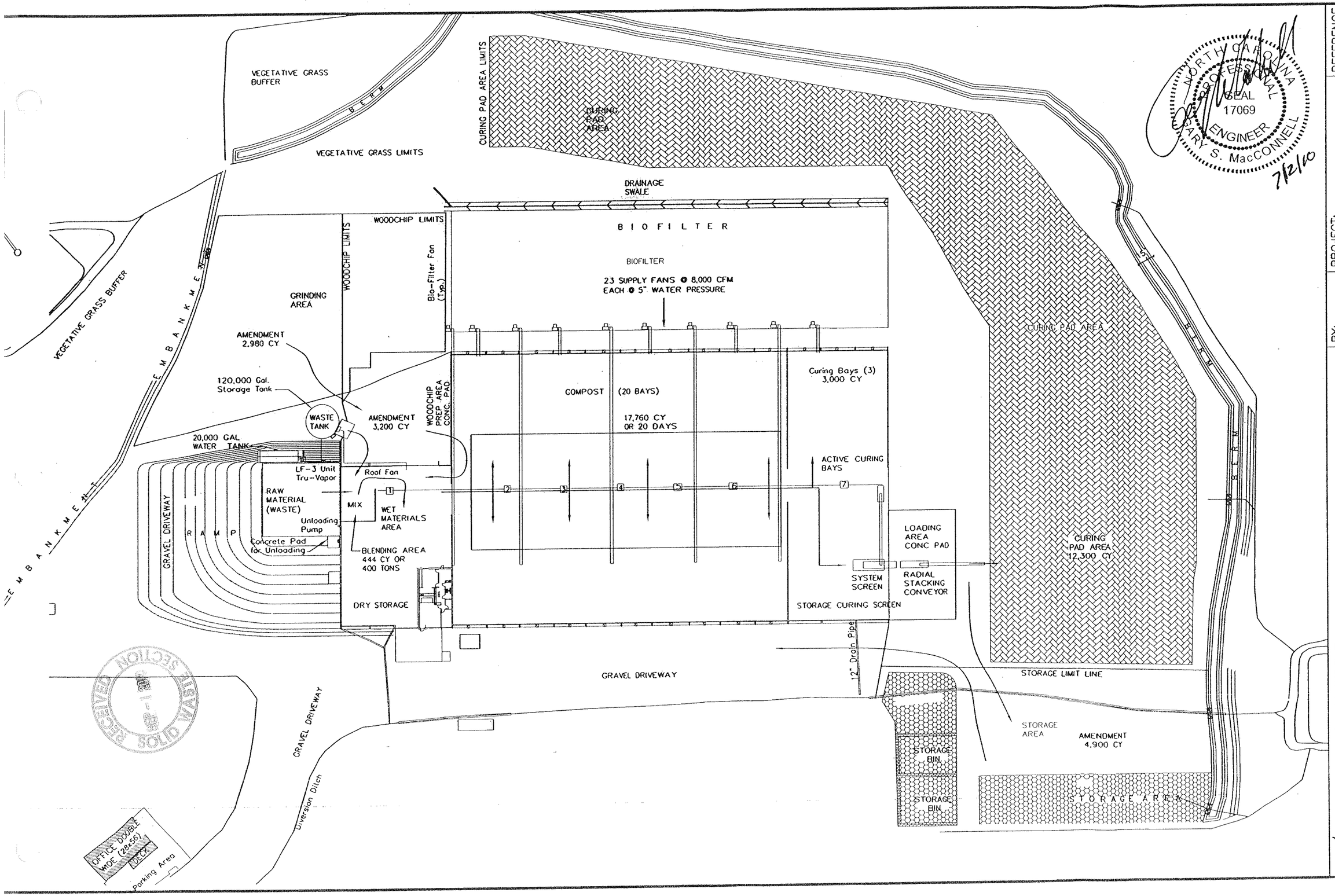

REFERENCE C-2

PROJECT: MCGILL ENVIRONMENTAL SYSTEMS

PROCESS FLOW DIAGRAM

CHATHAM COUNTY, NC

BY: MAE

JOB #: A26704.00

DATE: 07/12/10

MacCONNELL & Associates, P. C.
1903 NORTH HARRISON AVE., SUITE 102
CARY, NORTH CAROLINA 27513
P. O. BOX 129
MORRISVILLE, NORTH CAROLINA 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

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SEP - 7 2010
SOLID WASTE SECTION

Operating Manual

Standard Operating Procedures (SOPs) for the
McGill Regional Composting Facility at Merry Oaks

APPROVED
12/8/10
MES

McGILL
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McGill-Merry Oaks
634 Christian Chapel Church Rd.
New Hill, NC 27562
TEL: 919-362-1161
FAX: 919-362-1141

Foreword

This manual, a compilation of the company's Standard Operating Procedures (SOPs), has been prepared to assist McGill operations employees in understanding our compost manufacturing process. McGill Environmental Systems has a long and successful history of taking organic materials many think of as wastes and converting those wastes into value-added products (compost, topsoil and mixes) marketed under the McGill brand, as well as several private labels.

We have two types of customers: those who hire us to manage their wastes responsibly and professionally, and those who buy our compost and compost-based products. Both expect high standards from McGill. As a result, our manufacturing process is designed to not only comply with all applicable regulations regarding waste management, but also make a superior product.

Manufacturing high-quality compost is a combination of discipline, dedication and determination. All McGill operations employees are expected to adhere to these values at all times in their jobs. In the pages that follow, you will find detailed instructions on how to make good compost. You are expected to follow these procedures and protocols to the letter. In this way, and only in this way, can we continue to be the producer of such widely desired, high-quality composts and compost-based soil conditioners.

On behalf of all McGill employees, I thank you for your dedication to helping McGill be the best it can be.

M. Noel Lyons
President

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SOLID WASTE SECTION

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STANDARD OPERATING PROCEDURES

Feedstock acceptance

The McGill Chatham facility operates under a permit granted by The North Carolina Department of Environment and Natural Resources (DENR). Under that permit the following list of materials has been approved.

Waste Materials Accepted	Quantity (tons)
Residuals	
Raleigh, City of Public Utilities	13,000
Raeford, City of WWTP	4,000
OWASA (Press)	3,300
American Water Enterprises (Ft Bragg)	3,000
Greenville Utilities Commission	3,000
Moore County WWTP	1,800
Synagro-Mebane	1,350
Synagro Holly Springs(Dewater)	750
Town of Hillsborough	450
Synagro - Holly Springs	410
Synagro - Pittsboro	259
Apex, Town of (Middle Creek)	248
Aqua Carolina Meadows	224
Aqua Neuse Colony	222
Town of Benson	200
Aqua Governor's Club	111
Aqua The Preserve	101
Cottonwood	94
Saint Pauls, Town of	67
Aqua Hawthorne	59
Aqua Crooked Creek	55
Aqua Wood Lake	55
Bunn, Town of (Dewatering)	55
Vision NC, LLC (IBM)	47
Clayton, Town of	38
Indian Creek	19

Aqua USA (Heater Utilities)	18
Princeton, Town of	18
Aqua Neuse River Village	13
Old North Utility Services Inc	9
Golden State Water Company	7
Cary-North Water Reclamation	4
Residuals Total	32,983
Industrial Sludges	
Carolina-By-Products	2,911
ConAgra Foods	2,134
Garco Inc. (WST WTR)	1,951
Separator Solutions	1,429
Biogen Idec. Inc.	1,190
Noble Oil Service, Inc	714
DAK Americas (Dewatering)	457
Arclin	250
Talecris Biotherapeutics Inc.	217
Nitta Gelatin USA Inc.(Filter)	207
Nitta Gelatin, USA (BIO)	72
PGI Nonwovens	66
Stat Inc (Lance Foods)	49
Ajinomoto	43
Industrial Sludges Total	11,690
Water Treatment Residuals	
Water Treatment Residuals Total	11,000
Grease Trap Waste	
Grease Trap Waste Total	11,000
Food & Animal Waste, Feed	
Coca Cola	1,000
Allied Waste - Farmers Market	1,000
Cargill Inc - Raleigh	795
Allied Waste (Cargill-Raleigh)	659
Cargill Incorporated-Bean	555
Reser's Food Pre-Treatment	476
Allen Canning	289
Early Environmental	250
Smithfield Packing-Wilson	156
EPS Of Vermont, Inc.	500
Cargill Inc. - Fayetteville	122
Land Resource Management	97
Peanut Processors, Southern	33

Zebra Environmental	20
Piedmont Biofuels (Food)	12
A W North Carolina, Inc.(Food)	5
Food & Animal Waste, Feed Total	5,968
Total Waste Materials	***72,641***

Amendments	Quantity (tons)
Ash	
Full Circle Solutions-Ch Ash	7,500
Moncure Plywood	600
Cargill (Coal Ash)	100
Ash Total	8,200
Yard Waste	
Cary-Town of PWU (Yard Waste)	13,000
Simmons & Simmons	969
Republic Waste (Yard Waste)	9
Yard Waste Total	13,979
Shredded Pallets & Wood Waste	
Shredded Pallets & Wood Waste Total	4,468
Bedding	
Allied Waste (Charles River)	1,818
Corner Cotton Gin	18
NC State Vet School	450
Bedding Total	2,286
Tobacco Waste	
Univ. Leaf No. American US Inc	1,230
Philip Morris Int'n Mgmt LLC	131
Tobacco Waste Total	1,361
Sawdust	
Sawdust Total	500
Total Amendments	***30,794***

All new materials being considered for acceptance must undergo the McGill pre-acceptance approval process outlined below.

1. Analytical review

In order to ensure all finished composts meet or exceed standards for EPA Class A products, no feedstock is accepted by MES that cannot meet the same standard for toxicity, including metals.

In addition to issues related to quality of finished compost products, laboratory tests also provide data related to toxins, corrosivity and ignitability, nutrient content, calcium carbonate equivalency, percent solids, and other factors that influence formulation development and processing.

Client Services will arrange for the waste generator to provide laboratory analyses of the feedstocks for the parameters included in the attached Feedstock Analytical Review form.

All results will be reported to the Operations Manager for his review and approval.

Procedure:

1. Analytical review
2. Compost formulation review
3. Bench-scale evaluation
4. Generator file review
5. Economic evaluation

2. Compost formulation review

The Operations Manager and the Plant Manager shall complete the Compost Formulation analysis of the proposed feedstock in accordance with the attached Compost Formulation Model.

The Plant Manager must agree that the proposed feedstock will not compromise either mixture C:N ratios or mixture moisture content.

3. Bench/pilot-scale evaluation (optional)

For a new type of feedstock material, a bench or pilot scale evaluation may be warranted, as determined by the Operations Manager. Once analytical standards have been verified, an appropriate quantity of the proposed feedstock is composted to --

- Verify the feedstock is amenable to high rate, aerobic composting
- Develop a feedstock profile to be used in processing the waste stream
- Test any special amendments, bulking agents, handling, or processing systems that may be required to successfully process the feedstock.

All bench/pilot-scale evaluations shall be conducted by the Plant Manager, with the assistance of the Operations Manager.

4. Generator file review (optional)

Once analytical compliance has been verified and bench scale studies successfully completed, Client Services will conduct a review of the generator's file located in the offices of the agency of regulatory jurisdiction.

The purpose of this procedure is to verify that:

- The analyses provided by the generator for pre-acceptance are historically representative and consistent .

- There are no variations or fluctuations in feedstock quality which might adversely affect McGill's ability to process the waste or find beneficial reuse for the resulting compost product(s).

Client Services will report the results of his/her findings to the Operations Manager for approval.

5. Economic evaluation

For feedstocks that pass the preceding four (4) evaluations, the General Manager and the Client Services Manager shall complete the economic evaluation as shown in the attached Economic Evaluation model (part of the Compost Formulation Model).

Only Client Services and the Operations Manager shall make decisions regarding the fees to be charged to the Customer.

Analytical review worksheet

*TCLP PARAMETER	COMPLIANCE LIMIT	FEEDSTOCK LEVELS	COMMENT OR OBSERVATION
Arsenic	5.0 mg/L		
Barium	100 mg/L		
Benzene	0.5 mg/L		
Cadmium	1.0 mg/L		
Carbon tetrachloride	0.5 mg/L		
Chlordane	0.03 mg/L		
Chlorobenzene	100.0 mg/L		
Chloroform	6.0 mg/L		
Chromium	5.0 mg/L		
o-Cresol	200.0 mg/L		
m-Cresol	200.0 mg/L		
p-Cresol	200.0 mg/L		
Cresol	200.0 mg/L		
2,4-D	10.0 mg/L		
1,4-Dichlorobenzene	7.5 mg/L		
1,2 Dichloroethane	0.5 mg/L		
1,1-Dichloroethylene	0.7 mg/L		
2,4-Dinitrotolluene	0.13 mg/L		
Endrin	0.02 mg/L		
Heptachlor (and its hydroxide)	0.008 mg/L		
Hexachlorobenzene	0.13 mg/L		
Hexachloro-1,3-butadiene	0.5 mg/L		
Hexachloroethane	3.0 mg/L		
Lead	5.0 mg/L		
Lindane	0.4 mg/L		
Mercury	0.2 mg/L		
Methoxychlor	10.0 mg/L		
Methyl ethyl ketone	200.0 mg/L		
Nitrobenzene	2.0 mg/L		
Pentachlorophenol	100.0 mg/L		
Pyridine	5.0 mg/L		
Selenium	1.0 mg/L		
Silver	5.0 mg/L		
Tetrachloroethylene	0.7 mg/L		
Toxaphene	0.5 mg/L		
Trichloroethylene	0.5 mg/L		
2,4,5-Trichlorophenol	400.0 mg/L		
2,4,6-Trichlorophenol	2.0 mg/L		
2,4,5-TP (Silvex)	1.0 mg/L		
Vinyl Chloride	0.2 mg/L		

*TOTAL METALS PARAMETER	COMPLIANCE LIMIT** kg/ha/365 days	FEEDSTOCK LEVELS	COMMENT OR OBSERVATION
Aluminum			
Arsenic	2.0		
Cadmium	1.9		
Copper	75		
Lead	15		
Magnesium			
Mercury	0.85		
Molybdenum			
Nickel	21		
Selenium	5.0		
Zinc	140		
OTHER PARAMETERS		**FEEDSTOCK LEVELS**	**COMMENT OR OBSERVATION**
*Corrosivity			
*Ignitability			
*Reactivity			
pH			
Nitrogen			
Phosphorus			
Potassium			
% Moisture			
Carbon			
C:N			
Calcium carbonate equivalency			
Bulk density			
Sodium			

***Required for regulatory compliance** ****Bagged biosolids. Table 4, Section 503.13**

Additional comments/observations:

Report number(s)/dated _____ was/were reviewed by

_____ on _____.
(REVIEWER SIGNATURE) (DATE)

NOTE: Attach copies of laboratory analyses used for evaluation

MIX RATIO CALCULATIONS

INGREDIENTS	Ingredient A	Ingredient B	Ingredient C	Ingredient D	Ingredient E	Ingredient F	Ingredient G	Ingredient H	Ingredient I	Ingredient J	TOTAL MIX
C (% AS IS)	45.8	24.9	42.81	30	11.19	17.7	36	38.60	23.95	36.00	
N (% AS IS)	4.8	1	6.92	1.5	0.677	0.21	4	2.07	0.24	0.66	
MOISTURE%	82	83.3	89.47	85	75.29	44.08	95	38.06	42.53	23.42	
UNITS IN MIX BY WGT (LB)	1	1	1	1	1	1	1	1	1	1	17
UNITS IN MIX BY VOL (CY)	0	0	0	0	0	0	0	0	0	0	0
DENSITY (LBS/CY)	1660	1800	1150	1600	1800	1400	1660	750	500	350	
RELATIVE DENSITY	1.00	1.08	0.69	0.96	1.08	0.84	1.00	0.45	0.30	0.21	
POUNDS OF CARBON	0	0	0	0	0	0	0	0	0	0	6
POUNDS OF NITROGEN	0	0	0	0	0	0	0	0	0	0	0
C:N RATIO	9.54	24.90	6.19	20.00	16.53	84.29	9.00	18.65	99.79	54.55	**22.64**
POUNDS OF MOISTURE	1	1	1	1	1	0	1	0	0	0	9
NUMBER OF UNITS	1	1	1	1	1	1	1	1	1	1	17
PERCENT MOISTURE											**51.33**
UNIT TIP FEE/COST	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	-$1.00	-$1.00	
TOTAL TIP FEE/COST	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$0.00	-$0.00	$0.00

Notes:

1. Input Carbon and Nitrogen Percentages on a wet-weight basis.
2. Input Moisture Content Percentage.
3. Input Weight in pounds.
4. Input Bulk Density in pounds per cubic yard.
5. Input waste tip fee or amendment cost in dollars.
6. Input amendment costs as a negative number.

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STANDARD OPERATING PROCEDURES

Daily checklist for truck drivers

In order to keep vehicles in top working condition, prevent breakdowns, and avoid unscheduled repairs, the Dispatcher is responsible for developing and maintaining a system for daily walk-around inspection of all vehicles and trailer units.

This may be a check sheet that each driver completes and turns in before hitting the road, a daily log kept in the vehicle, or any other system that works for both drivers and Dispatcher.

A record of the daily inspections must be maintained by the Dispatcher and made available to the Plant Manager on request, with appropriate notation to the vehicle file.

At minimum, inspection points shall include:

- Spill response kit and procedures guidance
- Mirrors
- Tires
- Belts and hoses
- Couplings and hinges
- Fluid levels
- Signage

Before every run, inspect:

Spill response kit

Mirrors

Tires

Belts and hoses

Couplings and hinges

Fluid levels

Signage

At this time, drivers will also note other areas that may need replacement and repair, such as windshield wipers, tarps, etc. The Dispatcher will repeat inspections on a random basis to verify checklist indicators, inspecting each vehicle at least once per quarter.

NOTES:

Rules of the road for drivers

Policies regarding:

- Speeding
- Alcohol-related violations
- Weight limitations
- Covering loads
- Spill response
- Licensing
- Hours of service
- Physical exams

All company drivers and contract carriers are subject to the rules and regulations found in the Federal Motor Carrier Safety Regulations (FMCSR) and all General Statutes of North Carolina as they apply to commercial drivers and licenses, trucking, motor carrier certification, compliance and safety.

Following are specific guidelines set by McGill Environmental Systems:

Speeding. All power units have electronically-controlled engines, and these units can be "set" for maximum speed. Our units are set for a maximum speed of 70 miles per hour, which is Ryder's limit as well. Drivers are responsible for obeying the "rules of the road," which include speeding. Any speeding ticket received while in a company vehicle is the driver's responsibility.

All moving violations must be reported immediately upon receipt and tracked until final disposition by the appropriate court. This includes citations received in both personal vehicles and company vehicles.

Alcohol-related violations. Commercial Driver License (CDL) drivers are subject to additional scrutiny with respect to Driving While Impaired (DWI) and other alcohol-related moving violations. Presently, North Carolina has a policy of "zero tolerance" for NC CDL holders, which means any alcohol detected in a driver's system will result in revocation of the driver's CDL. This includes all random checks, road blocks, company vehicles and personal vehicles. The "bottom line" on alcohol consumption is DO NOT CONSUME ALCOHOL IF YOU PLAN TO DRIVE WITHIN 8 HOURS. (Depending on body weight and amount consumed, this could be a longer period of time.) Make sure you are road-ready, and, if you drink, allow time for the alcohol in your system to completely metabolize.

Weight Limitations. All transportation operations try to maximize their efforts by hauling close to their legally permissible weight. McGill's regular traffic — both inbound and outbound — can vary widely in weight from day-to-day, depending on moisture content and production processes. It is the driver's responsibility to load as close to

maximum gross vehicle weight as possible, and this varies depending on the length of the combined tractor and trailer.

McGill realizes loaded volume and weight is often beyond the driver's control and tolerates the occasional overweight and underweight load. But if this becomes a chronic problem or issue with a particular customer, management will address the issue with that customer.

Covering Loads. North Carolina General Statute (NC G.S.) 20-116(g) went into effect June 1, 2002, and requires all vehicles licensed for 7,500 pounds or more to not load higher than six inches below the top edge and to tarp all loads. Therefore, it is McGill policy that all loaded, open-top trailers must be covered before leaving the loading location.

Spill Response. A driver's skills in defensive driving and awareness of others sharing the road should prevent most spills from occurring. However, there are times when hard braking, swerving and other evasive measures cannot be avoided, and material may spill. Any such occurrence should be reported to the Traffic Manager as soon as possible so that appropriate action can be taken. Potential problems discovered during pre-trip inspection should be reported so that problems can be corrected.

Licensing. All drivers hauling materials for McGill Environmental Systems are required to have a CDL Class A license with Tanker Endorsement. The only current exception is the driver operating the roll-off container, which requires only a Class B.

Hours of Service. At present, McGill operates most lanes and drivers under the "100 air mile radius" exemption, which requires documentation of time-out on-duty and time-in off-duty. Requirements for this are found in the FMCSR, but are summarized here:

1. Driver operates within 100-air-mile radius of the normal work reporting location.

2. Driver returns to work reporting location and is released from duty within 12 consecutive hours.

3. Driver has at least 8 consecutive hours off-duty between work shifts.

4. Driver does not drive more than 10 hours.

5. Company maintains time records for six months, showing the following:

    - Time "on-duty" each day
    - Time "off-duty" each day
    - Total number of hours "on-duty" each day
    - For occasional drivers, the total time on duty for the previous seven days.

Anytime a driver operates outside of these guidelines, a regular log must be used, but

only for that day. The 70-hour/ eight-day rule applies, which means a driver cannot be "on-duty" (driving and on-duty, not driving) more than 70 total hours in the previous eight days.

Physical Examinations/Driver Certification. DOT physicals are required for driver certification. Emphasis is placed on blood pressure, diabetic illness, and vision. These physicals are good for a maximum of two years, but can be approved for as little as 90 days in the event of a medical concern that must be managed. Cost associated with these exams is the responsibility of the driver.

NOTES:

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STANDARD OPERATING PROCEDURES

Materials transport for drivers

Procedures for transporting:

Incoming materials

Compost products

For all loads

Transport documents are issued by McGill for every inbound and outbound load, and drivers are required to cross the weighscale both in and out of the facility.

Transport documents issued by others may be accepted if they conform to facility and state/federal Department of Transportation (DOT) requirements.

No material may be loaded or unloaded until proper documentation is presented or other authorization obtained from the Plant Manager.

All loads shall be tarped, with contents not to exceed six inches below the top edge of the trailer.

Incoming materials

The following procedure is to be followed for all raw materials (waste and amendment) shipped to a McGill facility:

1. Once initial acceptance has been approved by the Plant Manager, the Dispatcher will coordinate with the client representative and Plant Manager to set up a mutually-agreed transportation schedule.

2. The Dispatcher will, after securing the appropriate vehicles and drivers, provide notification to both the client and Plant Manager and initiate hauling.

3. The Dispatcher shall maintain an electronic schedule of all transportation activity, readily available to all employees, updating as often as necessary to reflect daily modifications in the schedule.

4. It shall be the responsibility of the Dispatcher to prepare and provide to the driver a manifest, including Chain of Custody documentation, for each load transported from the generator.

5. The driver shall obtain a release signature at the pick-up location and transport to the designated McGill facility, signing the Chain of Custody Document as transporter.

6. Upon arrival at the McGill facility, the load shall be weighed and documents verified by the Weighmaster.

7. For after-hours delivery, the driver shall act as Weighmaster to record transport weight and turn documents in to the Contract Administrator within 24 hours. The Weighmaster, or acting Weighmaster, will also sign the Chain of Custody.

8. Once documents are verified, the driver shall proceed to the off-load location as directed by the Weighmaster.

9. The driver shall remain with vehicle during off-loading. When off-loading liquids, the driver shall stand within 10 feet of the valve. For all other materials, the driver shall remain in the cab and in control of the off-loading procedure.

10. Immediately after off-loading, drivers shall move the vehicle from the off-loading zone. If departure from the facility will be delayed for any reason, the driver will move his/her rig to a designated parking area.

11. All drivers shall obey posted speed limits and route designations both on and off the highway.

Compost products

The following procedure is to be followed for all compost products shipped from a McGill facility:

1. The Dispatcher will, after consultation with the Plant Manager, schedule a driver and delivery time and prepare a bill of lading for each load of the customer's order.

2. The driver will present a copy of the bill of lading to the McGill loader operator before loading commences.

3. The loader operator will load the product and quantity specified on the bill of lading, add the time loading was completed, and initial the document before returning it to the driver.

4. The driver will present the bill of lading to the McGill Weighmaster for stamp and signature before leaving the composting facility.

5. The Weighmaster will note product, quantity, operator ID, and departure time in the transportation log and notify the Dispatcher of the departure time so the client may be notified of anticipated arrival.

6. The driver shall obtain authorized signatures when off-loading and return paperwork to the Contract Administrator within 24 hours of the drop.

7. The Contract Administrator shall verify that: all load information is recorded in a timely fashion, all loads are delivered for every order, and both electronic and paper files related to the order are maintained according to regulatory and facility requirements.

NOTES:

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STANDARD OPERATING PROCEDURES

Customer service for drivers

McGill truck drivers are often the person a customer deals with the most while doing business with McGill. These procedures are designed to ensure McGill drivers always represent the company professionally and courteously.

Drivers are McGill's most visible customer service representatives.

- Respect the customer's property. Maneuver trucks carefully to avoid damage to customer (or McGill) property.
- If waiting to be loaded, do not distract the customer's employees with idle chatter or inappropriate behavior.
- In the event of truck breakdown, attempt to move the truck away from customer's operations, notify the Dispatcher, and wait for help.
- If a dispute arises, do not try to settle it yourself. Refer the customer to the Dispatcher.

NOTES:

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STANDARD OPERATING PROCEDURES

Spill containment and response

1. All personnel shall practice spill prevention at all times. This includes compliance with all maintenance schedules, as well as daily inspection by drivers of rigs and trailers, paying particular attention to seals, valves, piping, hoses, and tire condition. Checklists shall be completed by each driver and appropriately filed on a daily basis.

2. Prior to leaving the McGill facility each day, drivers shall inspect and verify that the vehicle contains a complete Vehicle Spill Kit, a copy of the Spill Prevention and Control Plan, and emergency contact numbers.

3. Residuals shall be transported in approved and properly designed vehicles at all times.

4. All loads of residuals shall be carefully checked by the driver prior to departure to ensure safe transport.

At the beginning of each work shift, check to make sure a copy of the Spill Response plan and Spill Kit are in/on the vehicle.

Do not leave the scene of an accident until authorized to do so by the McGill On-site Response Coordinator.

In the unlikely event that a spill does occur, the following plan will be enacted:

1. The driver shall control the source of the spill, i.e., shut off valves, block ruptured tanks, etc.

2. The driver shall use the emergency number to notify the McGill dispatcher, who will take control of clean-up. Unless immediate medical attention is required, the driver shall not leave the incident site until released by the McGill on-site response coordinator. The driver shall cooperate fully with public safety personnel and remain at the incident location until released by the McGill response coordinator.

3. The dispatcher shall send an on-site response coordinator to the incident location, decide on an appropriate first response based on driver information, coordinate containment activity, and make required notifications (Plant Manager, regulatory agencies, etc.).

4. When arriving at the incident location, the on-site Response Coordinator shall assume control of the clean-up effort, determine level of response required, communicate with public safety officials, and coordinate with the Dispatcher to secure needed equipment and labor. The Response Coordinator shall remain at the site until clean-up is complete.

5. By the end of the business day, the Dispatcher shall provide a written Incident Report to the Plant Manager.

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NOTES:

Daily start-up and shutdown

1. Start-up

Prior to the initiation of daily operations, the Plant Manager will perform the following tasks:

a. Electronically inspect the air delivery system through the central monitor and confirm operational status of all blower units.

b. Inspect the temperature charts for unusual activity.

c. Verify capacity for the day's scheduled feedstock and amendment deliveries and establish the daily blending schedule. **IMMEDIATELY NOTIFY THE DISPATCHER IF TRANSPORT SCHEDULES MUST BE MODIFIED OR INCOMING DIVERTED** due to equipment breakdown, capacity issues, etc.

When the Plant Manager is not on site, the senior processing employee or other designated in-charge employee assumes responsibility for these tasks.

In addition, the Plant Manager will verify that blender and screening plant operators have performed daily equipment checks as per facility protocols and manufacturers' instructions. Daily checks shall include, at minimum:

- Cracks
- Loose parts on the frame of the machine
- Leaking fluids
- Broken gear teeth
- Excessive noise
- Air leaks
- Lighting levels

Every piece of equipment is to be inspected prior to start-up.

DO NOT start the equipment if repair or maintenance is needed.

Notify the Maintenance Technician or Plant Manager immediately if a problem or potential problem is spotted.

(Other routine maintenance on equipment will be performed, as needed, by the Maintenance Technician.)

2. Shutdown

Blending and screening operators will clean respective equipment and tidy the processing area at the end of the workday.

The Plant Manager (or senior processing employee) will repeat a.m. air delivery, monitoring system, and capacity inspections (for anticipated after-hours incoming loads), troubleshooting as needed.

A walk-through inspection of the processing area will be conducted by the last production employee to leave the site to verify equipment shutdown, proper clean-up, etc. Notations will be made of areas needing attention and communicated to the Plant Manager.

The gate at the main entrance will be locked by the last employee to leave the site. McGill and contract drivers entering after hours have keys and entry codes for gates.

LEAVING THE GATE OPEN AND THE FACILITY UNATTENDED IS AN ACTIONABLE OFFENSE AND MAY RESULT IN TERMINATION.

3. Other routine inspections

Routine inspections by the Operations Manager shall include:

- Random compliance verification including regulatory and operating procedures, monitoring, and record-keeping

- Drainage and sediment control basins, no less than monthly or after a major storm event, whichever comes first

Routine inspections by the Plant Manager shall include:

- Guttering and drainage system after a major rain event
- Stormwater collection basins and erosion control devices after a major rain event

Routine inspections by the Maintenance Technician shall include:

- Ductwork and piping
- Biofilter air flow and moisture levels
- Random verification monitoring of temperature sensors with manual meter

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STANDARD OPERATING PROCEDURES

Feedstock management

Proper management of the feedstocks handled by a McGill composting facility is very important to minimize odors, minimize the potential for fires, and make housekeeping easier.

Procedures:

Use dry bulking agent to block wet sludges from spreading over the floor.

Keep bulking agents separate from sludges.

Inspect materials when they are received.

Keep doorways clear of materials.

Keep truck pad clean.

Sludges

1. All incoming sludges deposited on the pit floor must be mixed with amendment and placed into a composting bay for curing.

2. If a particularly wet load of sludge arrives, quickly move a pile of dry bulking agent in front of the pit to keep the wet material from spreading out over the floor.

3. After a truck unloads, the driver uses the hose to wash off the truck pad, making sure all water enters the building through the door. Utility operator will also monitor and clean pad throughout day, as needed.

Liquids Storage Tank

1. Before a truck unloads liquids in tank, the driver checks the storage level indicator on side of tank to verify tank capacity.

2. Clean up any spillage with the hose, ensuring washwater drains into the pit. If pit drainage is not possible, the driver shall advise the Plant Manager so a quantity of finished compost or other dry material may be used as an absorbant. After clean-up, this material, which contains raw waste product, shall be deposited to the pit for processing.

Bulking Agents

1. After each truck delivers bulking agents to the dry amendment storage area, push up the newly-arrived material into designated storage area.

2. Visually inspect materials coming in as they are being unloaded. Notify the Plant Manager immediately of suspicious material.

3. Keep an eye on the various bulking amendment piles as you go about your work in the composting facility. If you think you see smoke rising from one of the amendment piles, notify the Plant Manager immediately.

4. Keep all doorways free of accumulations of materials.

NOTES:

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STANDARD OPERATING PROCEDURES

Blending feedstocks

The proper blending of raw materials is one of the most critical steps in making good quality compost. Mistakes in blending can result in compost piles that are too wet, which causes odors and generates leachate, or too dry, which chokes off the composting process and increases the risks of fire.

Procedure:

Mix thoroughly according to prescribed ratios.

Check moisture levels.

Adjust moisture, if needed.

Fill the bay.

1. Based on the formulation specified by the Plant Manager, mix the appropriate numbers of buckets of each material together on the floor next to pit. Be sure to turn the materials together thoroughly. Do not make the mix too wet (see "Squeeze Test" below). For example, the formulation might be:

    - One bucket of sludge
    - One-half bucket of compost
    - One and a half buckets of wood chips
    - One-bucket of Overs

2. To check the moisture level with a "Squeeze Test," grab a handful of the mixed materials in one hand. Form your hand into a clenched fist. If you see water dripping out of the mix, it's too wet. Now open your hand. If the material in your hand crumbles apart and falls to the floor, it's too dry. It's just right when the clumped material in your hand stays clumped together when you open your hand.

3. Blend materials until there is enough to fill approximately one-fourth of the bay, then start to load bay.

4. Repeat steps 1 through 3 until bay is full. (See SOP: *Preparing a composting bay.*)

NOTES:

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STANDARD OPERATING PROCEDURES

Preparing a composting bay

Making sure a composting bay is ready to accept a new batch of blended materials is another important step in ensuring the plant runs properly, resulting in the manufacture of a quality compost product. Once a bay has been emptied:

Procedure:

Brush out bay with Skid steer.

Clean aeration piping with pickaxe.

Rod-out aeration holes in piping.

Clean any water out of aeration piping.

Broom sweep aeration piping.

1. With the blowers on full-strength, use the brush attachment on the skid steer to brush material out of the channels.
2. Walk along each aeration channel, and using a pickaxe, drag any remaining material out from around the aeration pipes.
3. Using a one-half-inch rod, ensure each aeration hole is free of debris, using the pipe to punch the debris through the hole, if necessary.
4. Pry the end caps off the aeration pipes and make sure no free water is coming out. Put the end caps back on.
5. With the broom, sweep the aeration pipes from back to front of the composting bay.
6. Check all pipes for proper air flow.
7. Note the Bay Number and tell the Plant Manager the bay is ready to receive fresh mix.

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SOLID WASTE SECTION

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STANDARD OPERATING PROCEDURES

Filling a composting bay

Procedure:

Confirm channel prep and fan activation.

Place chips.

Place blended admixture.

Cap front of pile.

Place sensor.

Notify plant manager.

1. Make sure the aeration channels have been properly prepared and that the fans are **ON**.

2. Place a 3-inch layer of wood chips **evenly** on top of the aeration channels. Start at the back wall and come out 20 feet **(no more)** from the back wall.

3. Place blended materials on top of the wood chips to a height of 7 feet, always working from left to right. Don't overload your loader bucket. See the capping diagrams on the next page for the correct and the incorrect way to fill a bay.

4. Repeat Steps 3 and 4 in 20-foot increments working towards the front of the bay.

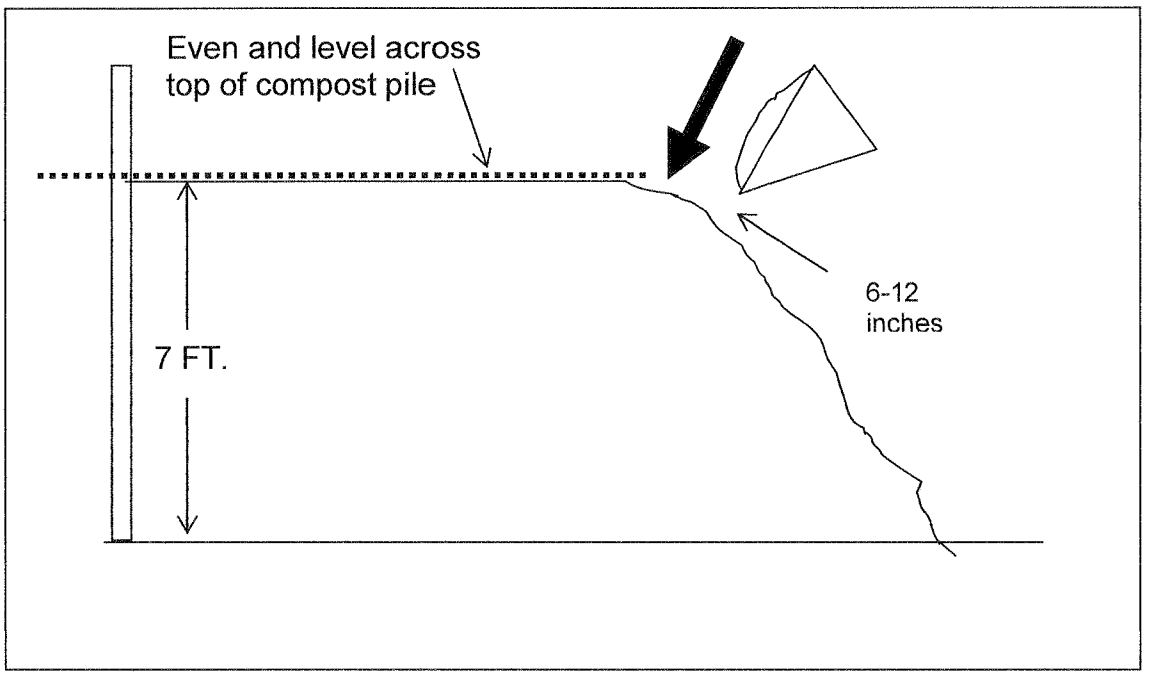
5. Place a 12-inch layer of finished compost on the front of the pile, sloping it back 6 feet onto the top of the compost pile.

6. Place temperature sensor 30 to 40 feet from the back wall, in the center of the bay, to a depth of approximately 3 feet .

7. Tell the Plant Manager that the bay is complete so the computer system can be turned on.

Capping diagrams

CORRECT



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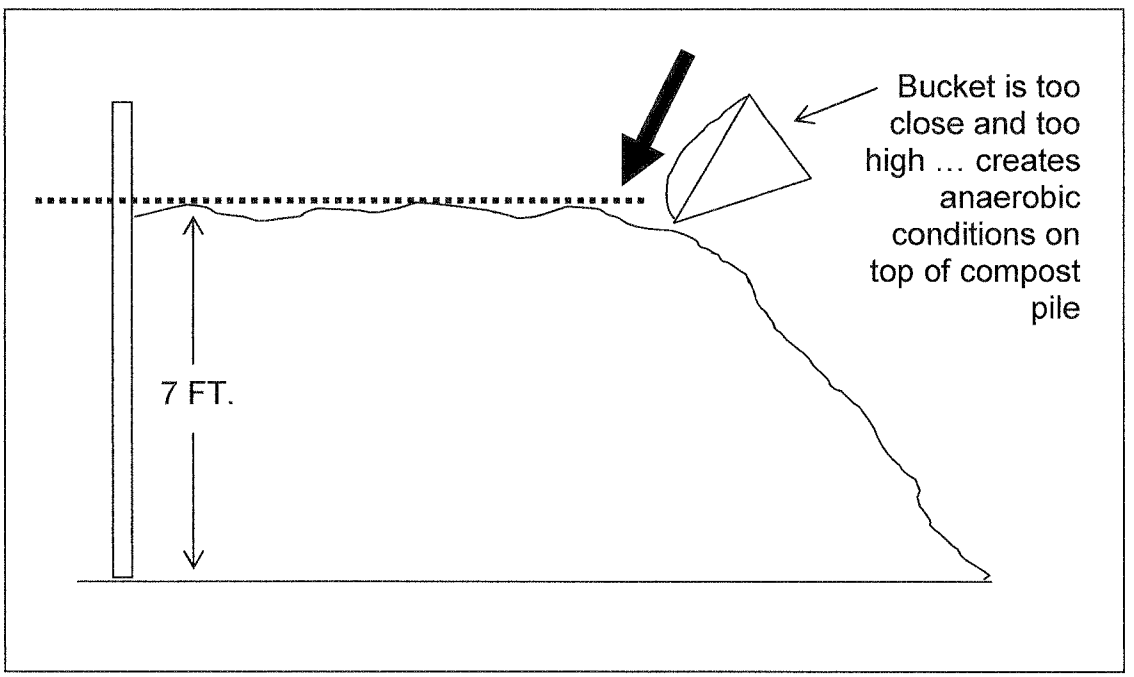

NOTES:

Aeration management

Composting is an aerobic process. It must take place in the presence of oxygen so microbes can do their work in decomposing organic materials. Oxygen is supplied by forced aeration blowers. There is one blower for each compost bay. Each blower is equipped with a Variable Frequency Drive (VFD) controller which adjusts blower speed based on compost bay temperature.

Procedures:

Give each bay a unique number designation.

Note what feedstocks went into each bay.

Check for PFRP compliance.

Check for VAR compliance.

Recycle any bay that has not met PFRP and/or VAR.

1. When the operator notifies the Plant Manager that a bay has been filled and the temperature sensor properly placed, the Plant Manager will activate or authorize activation of the bay in the McGill computerized Process Control System (PCS).

2. The individual activating the bay assigns a number to the bay based on:

   "xxmmddyy" , where

   "xx" = Bay Number
   "mm" = month (i.e. March = 03)
   "dd" = day
   "yy" = year

   When the bay is activated, the color of the bay on the computer screen will change from grey to brown.

3. On the feedstocks line of the PCS software, indicate the materials that were mixed together and loaded into that bay.

4. Turn the blowers mode to AUTOMATIC.

5. The computer will record temperatures every minute and monitor attainment/maintenance of temperatures required for regulatory compliance, known as a Process to Further Reduce Pathogens (PFRP). For McGill's particular composting process, that's a minimum temperature of 131 degrees Fahrenheit or 55 degrees Celsius. After three consecutive days at that temperature, the color of the bay on the computer screen will change from brown to green.

6. The date the bay is to be emptied will be determined by one or both of the following indicators:

   a. Whether it has met the regulatory requirement for Vector Attraction Reduction (VAR), which is 14 consecutive days of temperatures above 104 degrees Fahrenheit (45 degrees Celsius).

   b. When the bay emptying rotation schedule calls for the bay to be emptied. If a bay has not met VAR when it is scheduled to be emptied, the contents of the bay **MUST** be recycled to the front of the plant (the formulation for that day will be adjusted by the Plant Manager).

7. Approximately 24 hours before a bay is to be emptied, turn the blower mode to MANUAL and adjust the fan speed to "60," which stands for 60 Hertz, or the maximum speed of the blower. This will cool the pile down by introducing a large amount of air into the pile.

8. When the temperature probe is removed from the pile for emptying, turn the bay OFF. The color of the bay on the computer screen will change from green to grey.

NOTES:

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STANDARD OPERATING PROCEDURES

Unloading a composting bay

Procedures:

Remove temperature sensor.

Remove the first third of the bay.

Remove remaining content of bay, making a "Fat-T" shape.

Notify Plant Manager when bay is empty.

1. Remove temperature sensor

Carefully remove the temperature sensor so it is not damaged during the extraction process and place on the center of the back wall.

2. Remove first third of the bay

Working from left to right, remove the first 4-6 feet of material from the bay and transport to the screening area or other location as instructed by the Plant Manager.

3. Final Extraction

Verify that 12 aeration pipes are exposed at the front of the bay.

Proceed by removing one bucket width of material from each side of the bay to the depth of the loader.

Begin to remove the center portion, maintaining a loader-length exposed face along each side of the pile as material is removed, until the entire bay is cleared. If you could look down on the pile from the ceiling, the pile should always keep a "Fat-T" shape (see illustration on following page) with sight lines as straight as possible. The final material removed will be loader-length, in the middle, against the back wall.

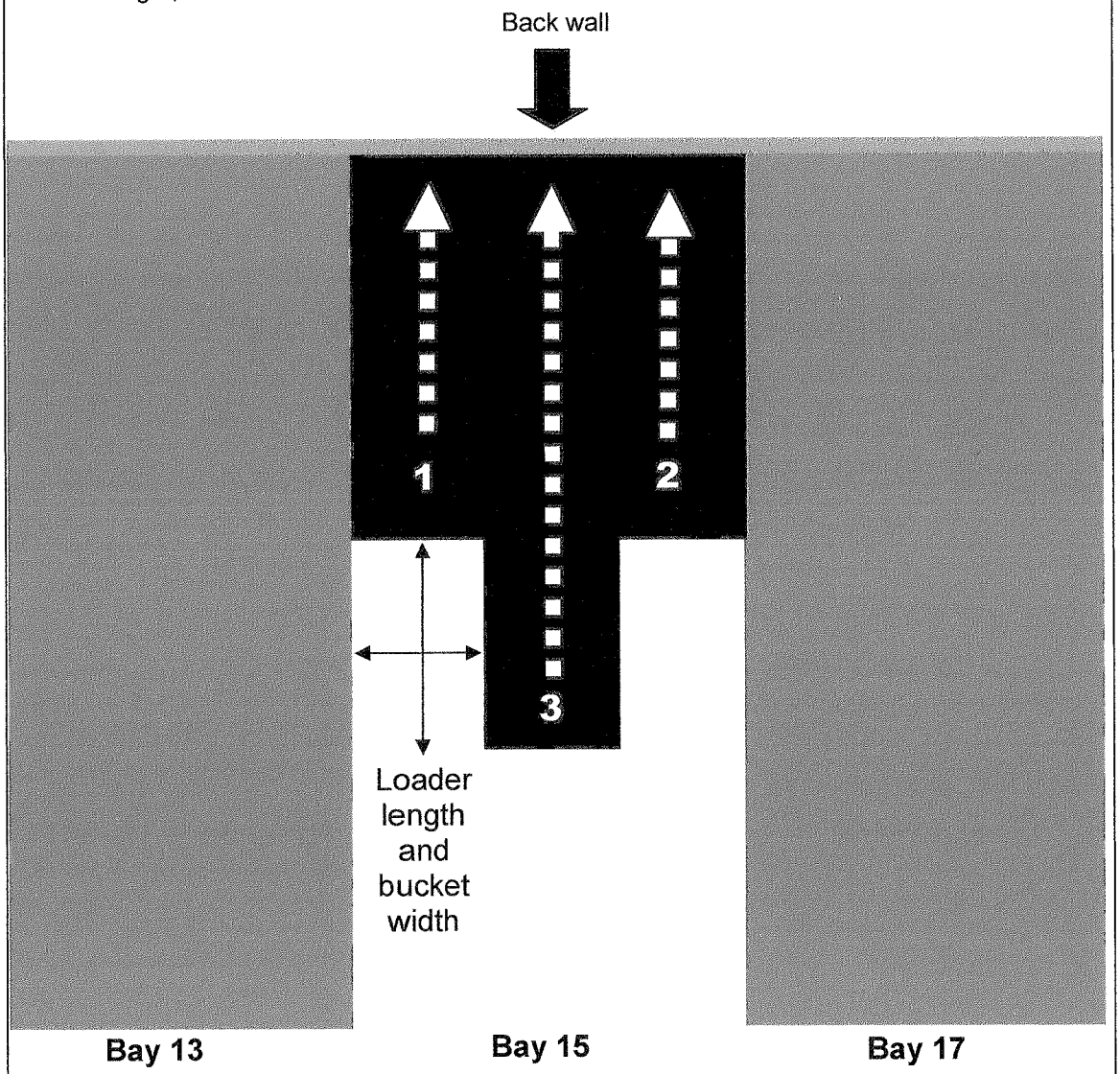
When all material has been removed, prepare the area for aeration management procedures and back-blade the floor with the front-end loader.

4. Notification

Notify Plant Manager when breakdown is complete.

Make a "Fat-T"

Once a loader-length/bucket width strip of material has been removed from each side of the center section, start on the middle. Systematically and evenly remove material from front to back in a manner that will maintain the "T" throughout the removal process, first from the left, then the right, then the center.



NOTES:

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STANDARD OPERATING PROCEDURES

Screening

Screening compost is important for two reasons: it allows the larger pieces of bulking agent to be recycled back to the front of the plant, and it is needed for the product to be acceptable to our compost customers.

1. Power up and switch on components from the back to the front. Operate empty for a few minutes before loading the hopper. Verify all systems are operating properly.

2. Approach screening plant with front-end loader and raise the bucket.

3. Verify there is sufficient space in the hopper to hold the bucket load, then begin to discharge material into the hopper. Usually, it is possible to deposit material much faster than the screening plant can discharge material. WAIT FOR THE SCREENING PLANT.

4. Stop and remove overs from discharge pile before it becomes high enough to touch the bottom of screen drum or conveyor belt.

5. Every 30 minutes or so, inspect the discharge conveyor. If visibility is good, this can be done from the loader cab. If not, get out of the cab and inspect from the ground.

6. Deposit finished compost in designated area. When moving material into a bay, establish an orderly routine. For example: one bucket into the hopper, one bucket into the bay, etc. Allow the screening plant to run empty for a few minutes before shutdown.

7. Conduct shutdown in the opposite order of startup (front to back). Always shut down the screening plant when it will be unattended for any length of time (lunch, break, etc.) and at the end of the work day.

8. Remove all loose material and debris from the screening plant and work area at the end of the work shift.

Procedures:

Start systems from back to front.

Verify all systems are operating properly before loading hopper.

Load hopper at an appropriate rate.

Remove overs regularly.

Move screened compost to designated area.

Shut down in opposite order of start-up.

NOTES:

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STANDARD OPERATING PROCEDURES

Loading a curing bay

1. Make sure the aeration channels have been properly prepared and that the fans are **ON**.
2. Spread wood chips on floor if directed to do so by the Plant Manager (optional step).
3. Place blended materials to a height of 7 feet, always working from left to right. Don't overload your loader bucket.
4. Repeat Step 3 in 20-foot increments working towards the front of the bay.
5. Place temperature sensor in the center of the bay to a depth of 4 feet.
6. Tell the Plant Manager the bay is complete so the computer system can be turned on.

Procedure:

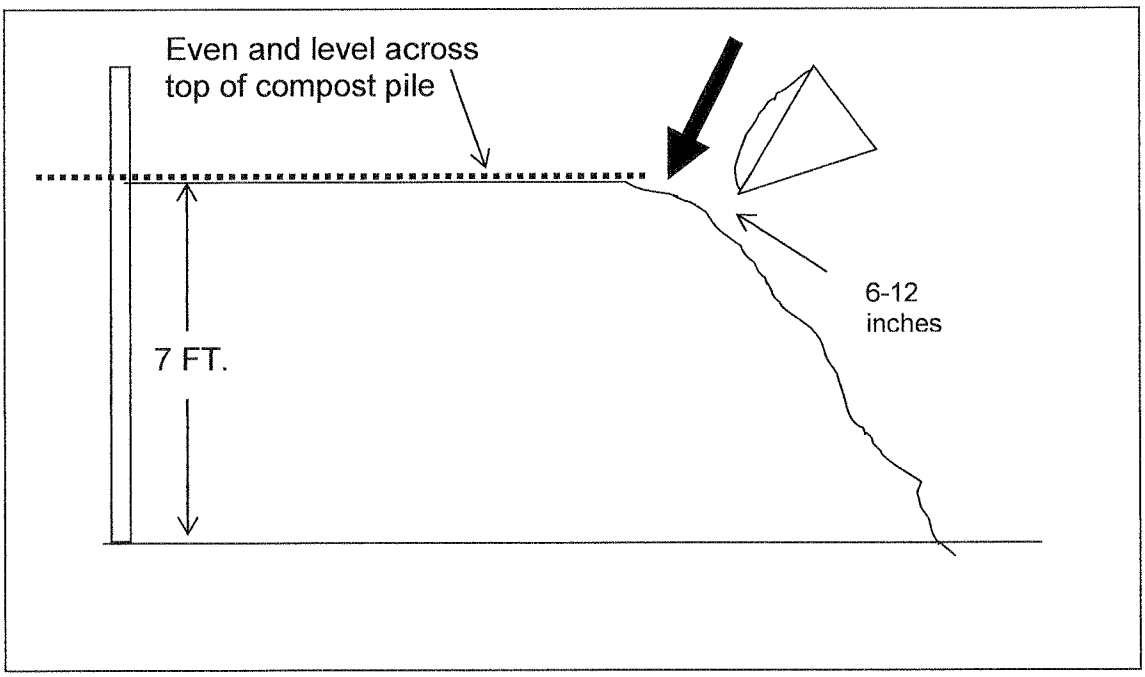
Make sure bay is properly cleaned.

Load bay in 20-foot increments.

Place temperature sensor.

Capping diagrams

CORRECT



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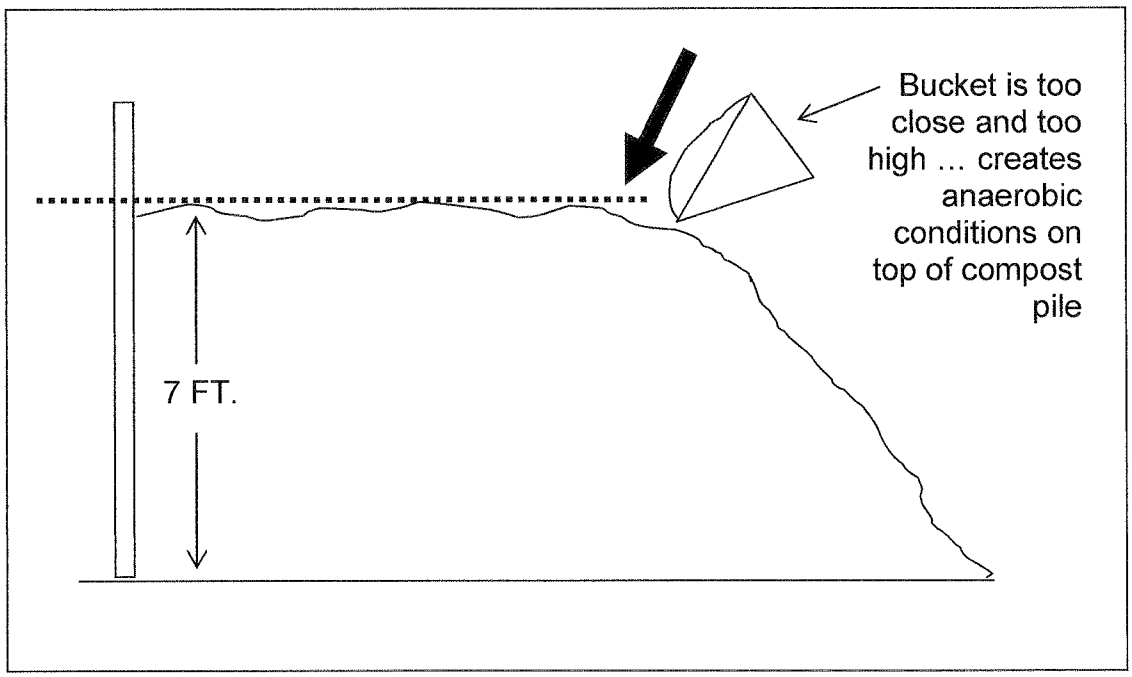

NOTES:

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STANDARD OPERATING PROCEDURES

Unloading a curing bay

1. Remove temperature sensor

Carefully remove the temperature sensor so it is not damaged during the extraction process and place on the center of the back wall.

2. Remove first third of the bay

Working from left to right, remove the first 4-6 feet of material from the bay and transport to the passive curing area.

3. Final Extraction

Verify that 12 aeration pipes are exposed at the front of the bay.

Proceed by removing one bucket width of material from each side of the bay to the depth of the loader.

Procedure:

Remove sensor.

Remove first third of bay.

Extract remaining material using the "Fat-T."

Notify plant manager when complete.

Now, begin to remove the center portion, maintaining a loader-length exposed face along each side of the pile as material is removed, until the entire bay is cleared. If you looked down on the pile from the ceiling, the pile should always keep a “Fat-T” shape (see diagram on next page) with sight-lines as straight as possible. The final material removed will be loader-length, in the middle, against the back wall.

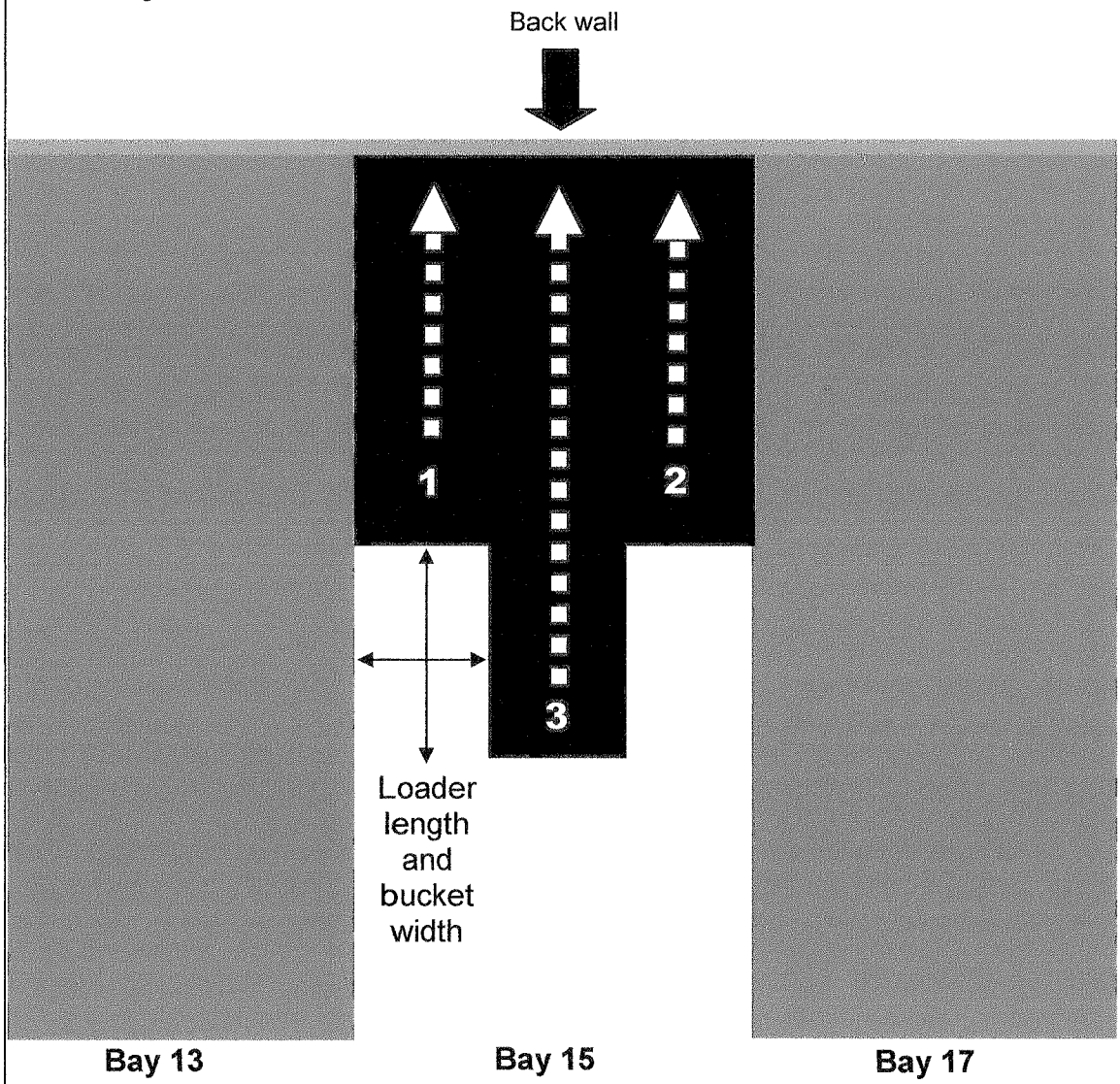
When all material has been removed, prepare the area for aeration management procedures and back-blade the floor with the front-end loader.

4. Notification

Notify Plant Manager when breakdown is complete.

Make a "Fat-T"

Once a loader-length/bucket width strip of material has been removed from each side of the center section, start on the middle. Systematically and evenly remove material from front to back in a manner that will maintain the "T" throughout the removal process, first from the left, then the right, then the center.



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STANDARD OPERATING PROCEDURES

Turning windrows

1. Check wind sock for satisfactory wind direction. Notify Plant Manager before turning windrows if wind is blowing south, southeast or southwest.
2. Make sure areas between all windrows have been cleaned before turning.
3. Attach turner to loader and place control panel inside loader cab.
4. With all switches in off position, start engine on turner.
5. Position middle of turner over windrow. Use switches on control panel to help align machine.
6. With engine RPMs at minimum, engage clutch on turner.
7. With clutch engaged, raise RPM to maximum speed.
8. Using control panel, lower windrow machine to desired height.
9. Drive at slow pace to end of windrow. Listen to engine speed. DON'T STALL ENGINE OUT.
10. At end of windrow, lower engine RPM and disengage clutch.
11. Raise windrow turner all the way up and position machine over next row to be turned.
12. Repeat steps 5 through 9 until all rows have been turned.
13. At end of turning all rows, clean between rows using bucket on loader.
14. Push end of rows up so there is no slope or low places for water to settle.

Procedure:

Check wind direction.

Drive at a slow speed.

Listen to the engine.

Clean between rows after turning.

Shape end of rows to prevent water from settling.

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STANDARD OPERATING PROCEDURES

Building windrows

1. Check wind sock for satisfactory wind direction. Notify Plant Manager before building windrow if wind is blowing south, southeast or southwest.
2. Using front end loader, retrieve material from designated location and move to end of section to start windrow.
3. Approximately 10 feet from the nearest windrow, drop and place material in a parallel line to that row.
4. Place second bucket on top of first until shape is approximately 12 feet wide at the base and 6 feet high.
5. Working in a straight line, continue to build windrow until desired length is achieved.
6. Clean all windrows before end of work day. (See SOP: *Cleaning windrows*)

Procedure:

Check wind direction.

Allow 10 feet between rows.

Build a windrow 12 feet wide at the base and 6 feet high.

Clean all windrows at the end of the workday.

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STANDARD OPERATING PROCEDURES

Cleaning windrows

1. Start from end of windrow and lower bucket level with ground in aisle between windrows.
2. Move forward, cleaning out material between rows until bucket becomes full.
3. Once bucket is full, lift and tilt bucket backward to capture material.
4. Place material on top of nearest windrow or, if close to the end of the row, place on end of row.
5. Continue in this manner until all aisles between rows have been cleaned.
6. Once aisles have been cleaned, push both ends of windrows up leaving no sloping or low ends. This prevents ends from getting saturated with water.

Procedure:

Start at the end of the row.

Deposit full buckets of material on top of nearest windrow or at end of windrow.

Shape end of windrows.

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STANDARD OPERATING PROCEDURES

Taking up windrows

1. Check wind direction before taking up windrows. If wind direction is south, southeast or southwest, check with Plant Manager before taking up.
2. Check temperature of windrows using manual temperature probe. Do not take up if temperature is above 105 degrees and notify Plant Manager.
3. Do not take up windrows if they appear to be wet or have an odor. Notify Plant Manager.
4. Take up row using front-end loader starting from end of row. As an option, two rows may be taken up at a time if beside each other.
5. Using shortest route, take bucket of material to designated location.
6. Continue in this manner until row(s) is/are completed.
7. After windrows have been taken up, scrape off entire cleared area using loader bucket.
8. With proper material, fill in all depressions.

Procedure:

Check wind direction.

Check windrow temperature.

Do not take up windrow if wet or odorous.

Remove material to designated area.

Scrape area and fill holes.

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STANDARD OPERATING PROCEDURES

Monitoring windrows

1. Check windrows daily to see if weather conditions will allow operation to run.
2. Based on weather conditions, turn all windrows daily as many times as possible to dry out material.
3. After approximately 30 days of conditioning windrows (could vary depending on moisture level of material when rows are built), monitor temperature of rows until it reaches between 100 to 105 degrees.
4. When temperature reaches satisfactory level and rows are dry enough, windrows can be taken up. Check with the Plant Manager if there is any question as to row readiness for take-up.
5. Make sure windrows are cleaned up at all times after turning.
6. Fix any holes that may have occurred during operation.

Procedure:

Check weather conditions before beginning turning procedures.

Turn as many times as possible during the day.

Monitor windrow temperatures and moisture levels.

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STANDARD OPERATING PROCEDURES

Housekeeping

Housekeeping is one of the most important ways to control odor and present a professional appearance to our visitors.

Remember -- this is as much *your* plant as it is the company's. Keeping the plant looking good is one way you can express your pride in doing a good job.

1. Loader tires (and other vehicles) can easily spread small amounts of biosolids around on gravelled roadways. If you see such tracking, get a shovel and clean it up.

2. Keep the concrete pad at the unloading ramp clean at all times. Use the hose to wash any spillage into the pit at the front of the plant.

3. Do not throw trash on the ground ... put it in the trash can. Pick up other trash and debris when you see it. TIDINESS IN AND AROUND THE PLANT IS EVERYONE'S RESPONSIBILITY!

4. Loaders and buckets are to be cleaned every day. Cleaning frequency may vary based on usage and as directed by the Plant Manager.

Procedure:

Keep an eye on traffic areas and clean up spots where biosolids have dropped onto the gravel.

Wash down the ramp after spills, no matter how small.

Dispose of trash properly.

Keep loaders and buckets clean.

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STANDARD OPERATING PROCEDURES

Front-end loaders

1. At the end of each shift, loader operators are to clean loader buckets inside the plant and pull loader to front of plant for servicing.
2. Air filters will be cleaned first (as needed) and radiators blown out using pressured air. Too much air could damage filter, so check to make sure no holes or tears are in filter.
3. Park loader on ramp pad and hose down the entire loader, removing all loose material and debris.
4. Before the loader is operated the next day, the operator must do a daily check of the loader using the checklist provided by the Plant Manager."
5. Operator must check off all inspection/prep points on the list to indicate completion and place the Check List in the Plant Manager's office.
6. Any problems found must be reported to supervisor/plant manager immediately.
7. If no problems are noted, loader is ready for operation.

Procedure:

Clean buckets at end of shift and park at front of plant for servicing.

Inspect/clean air filter and radiator.

Hose down the loader.

Each morning, complete checklist.

Report problems.

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STANDARD OPERATING PROCEDURES

Aeration/biofilter system

1. Intake fans

When a bay is filled and sensor placed, the compost operator switches on the fan and activates the monitoring system from the computerized process control panel.

If the computer system fails, manual override is possible at the control panel boxes. Control box for blowers 1-10 is in the main control room; control for blowers 11-23 is in the box to the left side of the biofilter.

Each switch is marked with its corresponding blower number (1-23).

The computer screen is monitored daily by the Plant Manager or designated employee. There is an indicator on the screen if a fan malfunctions. In addition, a "malfunction" signal light is also located on the outside of the control panel.

Daily maintenance by Maintenance Technician. Inspect for signs of wear. Repair and replace parts as needed. Grease bearings as per manufacturer specifications; check the manual in the manager's office for recommended schedules.

2. Aeration Channels

After all composted material has been removed from the aeration bay, the compost operator cleans and inspects the aeration channels according to the following procedure:

Procedure:

When bay is filled and sensor placed, activate fan.

Monitor control panel.

When bay is empty, clean channels with blowers in the ON position.

Inspect ductwork and biofilter regularly.

Report heightened odors at biofilter and run odor control system as needed.

1. With the blowers ON, remove accumulated material with pick-axe or scraper.
2. Check to make sure no pipe is blocked by running your hand along the air holes. If air is not coming out, remove pipe and clean.

3. If pipe is cracked or broken, remove and replace.

3. Extraction ductwork

The Maintenance Technician will inspect exterior where ductwork leaves the building for leaks (negative pressure) and repair with caulking.

4. Biofilter

The biofilter is working well if steam is rising in a uniform pattern over the surface of the pile and odors are mild and non-offensive. The inspector should only be able to detect mild odors when near the biofilter.

If heightened odor levels are detected, report immediately to the Plant Manager.

Run odor control system as needed. The odor control system is located in the building next to the pit doors and can be used to help reduce odor.

Activate the system in the following manner:

1. Turn yellow water valve located next to pump motor to the ON position.

2. On the control panel located to the right of the pump system, turn ZONE 1 to MANUAL. This will start the system.

3. ZONE 2 controls the system over the blue storage tank. Start ZONE 2 by turning to MANUAL.

4. To shut down the system, turn yellow water valve to OFF position. Turn ZONE 1 to OFF position. Turn ZONE 2 to OFF position.

NOTE: Except for biofilter material, all components of the aeration system are designed for long-term service. With proper use and routine maintenance, these components will not require replacement. Biofilter media is replaced as needed (every 2-3 years).

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STANDARD OPERATING PROCEDURES

Screening system

The following are general guidelines for Screening Plant Operators:

1. The control panel is located in the screening area near the screening plant. Know where the panel is and where the emergency shutoff is located on the panel.

2. At the beginning of each workday, inspect all moving parts and lubricate. If repair or maintenance is indicated, contact the Maintenance Technician or Plant Manager.

3. Check screen for any compost build-up. Clean as needed.

4. Allow the screening plant to run empty for a few minutes before shutdown.

5. Shut down in opposite order of start-up (front to back).

6. At the end of the work shift, remove all loose material and debris from the screening plant and work area.

7. Wash screening plant periodically, as directed by the Plant Manager.

Procedure:

Before start-up, inspect all moving parts and lubricate.

Clean the screen, as needed.

Let the screen run empty for a few minutes before shutdown.

Shut down in the opposite order of start-up and remove debris.

NOTES: